ASTOUNDING

Science-fiction 25c

FEB. '43
REG. U. S. PAT. OFF.

THE WEAPON MAKERS

by A. E. van VOGT

FEBRUARY · 1943

A STREET AND SMITH PUBLICATION

When a COLD comes at you . . . 100 miles an hour!

—gargle LISTERINE *Quick!*

It May Spare You a Deep-seated Cold or a Nasty Sore Throat

Listerine Antiseptic immediately starts to kill the threatening germs which left the other fellow's nose and throat to set up housekeeping with you.

The more of these germs Listerine Antiseptic destroys, the less chance there is of a "mass invasion" of the tissue, followed by the discomfort of a cold and sore throat.

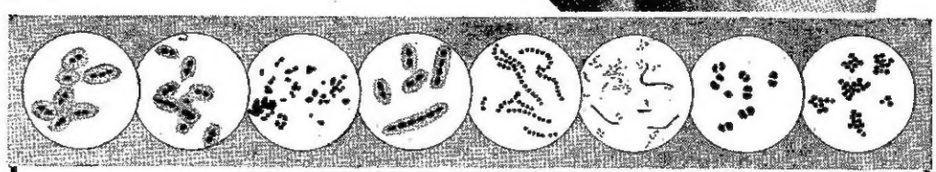
In tests with Listerine Antiseptic, germs on mouth and throat surfaces were reduced as much as 96.7% fifteen minutes after a Listerine gargle—up to 80% one hour after.

We believe this explains Listerine's astonishing clinical test record in combatting colds. These tests, made over a period of 11 years, consistently showed:

Regular twice a day Listerine Antiseptic users had fewer colds and fewer sore throats than those who did not use it.

Don't you think, in view of these facts, that Listerine Antiseptic, used systematically, is a worthwhile precaution against colds as well as an emergency treatment when a cold is coming on?

If you've been in contact with those with colds—if you've been in a draft—if your feet have been wet and cold—and you feel under par with a cold coming on, never omit the Listerine gargle. Lambert Pharmacal Co., *St. Louis, Mo.*



Pneumococcus Type III, Pneumococcus Type IV, Streptococcus Viridans, Friedlander's Bacillus, Streptococcus Hemolyticus, Bacillus Influenzae, Micrococcus Catarrhalis, Staphylococcus Aureus

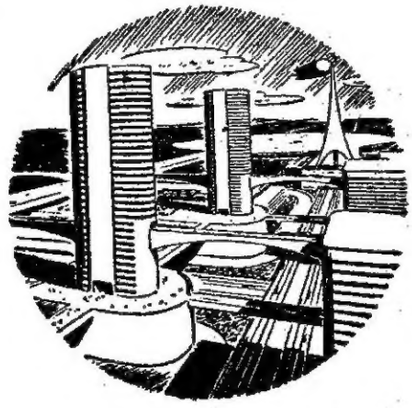
THE "SECONDARY INVADERS"

Above are some types of "secondary invaders", millions of which may exist on the mouth and throat surfaces. They may cause no harm until body resistance is lowered when they may invade the tissue and set up or aggravate the troublesome aspects of the infection you call a cold. You can see how important it is to attack them before they get the upper hand.

Note How Listerine Reduced Germs

Actual tests showed reductions of bacteria on mouth and throat surfaces ranging up to 96.7% fifteen minutes after the Listerine Antiseptic gargle, and up to 80% one hour after the Listerine gargle.

Prepare TODAY for the Victory-World of TOMORROW!



• There are two big reasons why you should start TODAY to become a trained specialist in some one line of work.

• FIRST — and most important right now — sound, practical training will make you a better fighter on the industrial front, and enable you to play a much more important part in outproducing our Axis enemies!

• SECOND — in the victory-world of tomorrow, even more than yesterday and today, *trained men* will be in demand to fill the best, and highest paying, jobs in business and industry!

• Right now is the time for you to join the 100,000 American men who are studying low-cost, spare-time I. C. S. Courses in 400 different business and technical subjects. Mail this coupon for free booklet and complete information — and mail it today!

INTERNATIONAL CORRESPONDENCE SCHOOLS

HELPING TO TRAIN AMERICANS FOR VICTORY

LET'S GO! U.S.A. KEEP 'EM FLYING!

BOX 4905-N, SCRANTON, PENNA.

Without cost or obligation, please send me a copy of your booklet, "Who Wins and Why," and full particulars about the course *before* which I have marked X:

TECHNICAL AND INDUSTRIAL COURSES

- ☐ Air Brake
- ☐ Air Conditioning
- ☐ Airplane Drafting
- ☐ Architectural Drafting
- ☐ Architecture
- ☐ Auto Engine Tune-up
- ☐ Auto Technician
- ☐ Aviation ☐ Aviation Mechanic
- ☐ Blueprint Reading
- ☐ Boilermaking
- ☐ Bridge Engineering
- ☐ Chemistry ☐ Coal Mining
- ☐ Civil Engineering
- ☐ Concrete Engineering
- ☐ Contracting and Building
- ☐ Cotton Manufacturing
- ☐ Diesel Engines
- ☐ Electrical Drafting
- ☐ Electrical Engineering
- ☐ Electrician
- ☐ Electric Lighting
- ☐ Foundryman ☐ Heating
- ☐ Heat Treatment of Metals
- ☐ Highway Engineering
- ☐ House Planning
- ☐ Industrial Metallurgy
- ☐ Locomotive Engineer
- ☐ Machinist ☐ Inspector
- ☐ Management of Inventions
- ☐ Marine Engines
- ☐ Mechanical Drafting
- ☐ Mechanical Engineering
- ☐ Mine Foreman
- ☐ Navigation ☐ Patternmaking
- ☐ Plastics ☐ Plumbing
- ☐ Public Works Engineering
- ☐ Pulp and Paper Making
- ☐ Radio, General
- ☐ Radio Operating
- ☐ Radio Servicing
- ☐ R. R. Section Foreman
- ☐ R. R. Signalman ☐ Refrigeration
- ☐ Sanitary Engineering
- ☐ Sheet Metal Work
- ☐ Ship Drafting
- ☐ Shipfitting ☐ Shop Practice
- ☐ Steam Electric ☐ Steam Engines
- ☐ Steam Fitting
- ☐ Structural Drafting
- ☐ Structural Engineering
- ☐ Surveying and Mapping
- ☐ Telegraphy ☐ Telephony
- ☐ Textile Designing
- ☐ Toolmaking ☐ Tool Design
- ☐ Welding, Gas and Electric
- ☐ Woolen Manufacturing

BUSINESS COURSES

- ☐ Accounting ☐ Advertising
- ☐ Bookkeeping
- ☐ Business Correspondence
- ☐ Business Management
- ☐ Cartooning ☐ Civil Service
- ☐ College Preparatory
- ☐ Commercial
- ☐ Commercial Illustrating
- ☐ Cost Accounting
- ☐ C. P. Accounting
- ☐ First Year College
- ☐ Foremanship ☐ French
- ☐ Good English
- ☐ High School
- ☐ Managing Men at Work
- ☐ Railway Postal Clerk
- ☐ Salesmanship
- ☐ Secretarial ☐ Spanish
- ☐ Showcard and Sign Lettering
- ☐ Traffic Management

HOME ECONOMICS COURSES

- ☐ Advanced Dressmaking
- ☐ Foods and Cookery
- ☐ Home Dressmaking
- ☐ Professional Dressmaking and Designing
- ☐ Tea Room and Cafeteria Management, Catering

Name.....*Age*.....*Address*.....

City.....*State*.....*Present Position*.....

Canadian residents send coupon to International Correspondence Schools Canadian, Limited, Montreal, Canada
British residents send coupon to I. C. S., 71 Kingsway, London, W. C. 2, England

AST—1R

ASTOUNDING SCIENCE-FICTION

TITLE REGISTERED U. S. PATENT OFFICE

Contents for February, 1943, Vol. XXX, No. 6

John W. Campbell, Jr., Editor, Catherine Tarrant, Asst. Editor

Serials

THE WEAPON MAKERS . . . . . **A. E. van Vogt** . . . 9

First part of a three-part novel of one man against the two greatest powers in the whole Solar System—the Isher Empire itself, and the vast, secret power of the Weapon Shops.

OPPOSITES—REACT! . . . . . **Will Stewart** 95

The ship had been built by beings utterly alien; their ship was half made of dreaded seetee—and full of a hundred death traps left by their alien minds!

Novelette

MIMSY WERE THE BOROGOVES . . . . **Lewis Padgett** 52

This is the first science-fiction story that I know of which has considered the children's toys of the far future. Simple little items— But—what toys!

Short Stories

FLIGHT INTO DARKNESS . . . . . **Webb Marlowe** . . . 40

A story of the reconstruction period after the war—and the only possible cure for a hundred-percent-convinced Fascist.

THE MAN IN THE MOON . . . . . **Henry Norton** 70

The queer little fellow had strange ideas. A harmless little man, who wanted light, and a workbench—that grew. He didn't quite seem to fit our busy civilization. Didn't fit Earth at all—

Article

GOD'S FOOTSTOOL . . . . . **Malcolm Jameson** . . 76

You may have heard the Earth's an "oblate spheroid." If you think that's a definite shape, this fact article may make things a little less clear.

Readers' Departments

THE EDITOR'S PAGE 6

IN TIMES TO COME 39

Department of Prophecy and Future Issues.

THE ANALYTICAL LABORATORY 87

An Analysis of Reader's Opinions.

PROBABILITY ZERO! 88

Calling All Liars!

BRASS TACKS 92

Concerning Purely Personal Preferences.

Cover by William Timmins

Illustrations by Jameson, Kolliker and Kramer

OUT SECOND FRIDAY EACH MONTH

NEXT ISSUE ON SALE FEB. 12, 1943

$2.50 per YEAR 25c per COPY

Printed in the U.S.A.

Monthly publication issued by Street & Smith Publications, Incorporated, 79 Seventh Avenue, New York City. Allen L. Grammer, President; Henry W. Ralston, Vice President; Gerald H. Smith, Secretary and Treasurer. Copyright, 1943, in U. S. A. and Great Britain by Street & Smith Publications, Inc. Reentered as Second-class Matter, February 7, 1938, at the Post Office at New York, under Act of Congress of March 3, 1879. Subscriptions to Countries in Pan American Union, $2.75 per year; elsewhere, $3.25 per year. We cannot accept responsibility for unsolicited manuscripts or artwork. Any material submitted must include return postage. The editorial contents of this magazine have not been published before, are protected by copyright and cannot be reprinted without the publisher's permission. All stories in this magazine are fiction. No actual persons are designated either by name or character. Any similarity is coincidental.

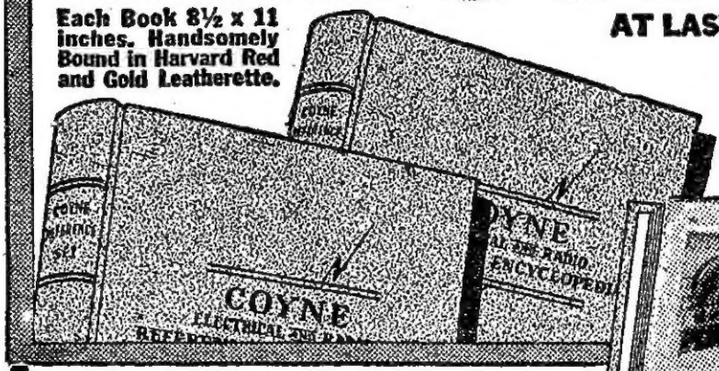
STREET & SMITH PUBLICATIONS, INC. • 79 SEVENTH AVE., NEW YORK

7 Days FREE TRIAL

—Costs You Nothing to Examine This Amazing New Three-Volume Set of REFERENCE BOOKS of PRACTICAL

ELECTRICITY

Each Book 8½ x 11 inches. Handsomely Bound in Harvard Red and Gold Leatherette.



AT LAST! *A set of electrical books written in clear, plain, understandable language for the "beginner" or "old timer." Solves your everyday electrical problems easily, quickly, and thoroughly.*

SEND NO MONEY! COUPON BRINGS COMPLETE SET!

Now at last, it's easy, practical to get a knowledge of Electricity at home. Whether you want to learn Electricity or whether you are now doing electrical work, you need these books.

AUTHORITATIVE. PRACTICAL—prepared by experts. Used regularly on the job by hundreds of Electricians, service men, radio men, air cadets, students, maintenance men, etc. EASY. COMPLETE. Covers everything Electrical: Armature winding, A.C. and D.C. Motors, generators, electronics, automotive electricity, refrigeration, etc., etc. Answers your electrical questions quickly, clearly, completely. Also includes Radio, Television.

FREE—with Reference Books

Send for these reference books now, and I'll include 1 full year of Technical Service—personal advice by mail on any Electrical or Radio subject.

SEE THEM—RISK FREE

Don't send a penny. Simply mail coupon below and receive your set. Examine books 7 days, with no obligation. Then, if you decide they are the finest, most practical reference set you ever saw, send $3, and the same amount monthly until total price of $12 is paid. I'll prepay all shipping charges. Offer is limited. Mail coupon NOW!

H. C. LEWIS, Pres., COYNE ELECTRICAL SCHOOL
500 So. Paulina St. Dept. 13-R6, Chicago, Ill.

HUNDREDS OF PICTURES AND DIAGRAMS! HUNDREDS OF ELECTRICAL SUBJECTS* AT YOUR FINGER TIPS!

A few of the many branches of Electricity explained and pictured in this amazing set are:

Air Conditioning	Refrigeration	Power Plants
Telephony	House Wiring	Diesel Engines
Auto Electricity	Electric Signs	Motors
Talking Pictures	Home Appliances	Armatures
Generators	Switchboards	A.C. and D.C.

*Complete Ready Reference Index of over 2000 listings tells you instantly where to look up any electrical fact.

H. C. LEWIS, Pres.,
COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Dept. 13-R6,
Chicago, Ill.

NO RISK COUPON

Send me the big 3-volume Coyne Electrical and Radio Encyclopedia, postpaid. Within 7 days after receiving the books, I'll either return them or send you $3, and $3 a month until advertised price of $12 is paid.

NAME.....

ADDRESS.....

CITY.....STATE.....

OCCUPATION.....AGE.....

SAVE 10%. Send cash price, $10.80, with order if preferred—you save $1.20. Same 7-day free trial and return privilege.

SILVER LINING

We're not particularly interested in politics; technology is considerably more satisfying for prophets. In technology, process A plus raw material B can be pretty reliably expected to produce trend C. There may be some rationale in political history, but the Mendeleef Table of political elements is still to be deduced. The chemist can predict not only the existence of elements still unseen by man, but the properties of their salts and compounds, the density, color, hardness, melting and boiling points and stability of chlorides and oxides of elements no man has ever separated.

Occasionally, politics does intrude its unpredictable elements into a chemical reaction, however, with results that upset the whole scheme. The Silver Bloc has had an astonishing effect on the chemistry of silver. Silver mining is an important industry, nearly as great, financially, as the manufacture of noodles. To protect the silver-mining States against the harsh exigencies of competition, the Silver Bloc fixed a thoroughly artificial price. The price is so high as to make the industrial use of American silver impossible.

Silver, as a matter of fact, is one of the most useful metals known to man. It has the highest conductivity for both electricity and heat of any known material. At a red heat, silver oxide decomposes into silver metal and free oxygen; obviously, therefore, silver will not oxidize at a red heat. Its high resistance to corrosion makes it an extremely good metal for making large-scale industrial chemical ware and chemical pipes, particularly for handling "fine" chemicals.

Mechanical properties of silver are equally advantageous. Silver, although not exceptionally hard or strong in the pure metal, is most exceptionally tenacious. It has a rubbery toughness that permits it to stretch under violent stress where such stronger, harder metals as stainless steel would tear like paper. The copper-beryllium alloys that produce bronzes with a hardness great enough to make steel-cutting cold chisels, and formed sections with a strength exceeding that of a good grade of steel are almost duplicated in silver-beryllium alloys. When desired, then, silver ninety-eight percent pure can be given strength and hardness equaling that of steel.

Some metals in the table of elements form almost no alloys; they simply refuse to blend with other metals and, when melted up with them, crystallize out separately on cooling. Other metals have a very great willingness to mix with others to form true—and useful—alloys.

Silver is an element willing to alloy with nearly any of the metals in the table. Since it will "wet" and alloy with other metals in the molten state, it makes a wonderful soldering and brazing material. Its willingness to alloy is so great it acts as a sort of metallic wetting agent; just as the wetting agents dissolved in water tend to make water wetter, more willing to actually make contact with repellent surfaces, silver will make other metals "wet" iron, steel, and other machine materials to form a strong, permanent weld. Copper is an exceptionally good metal-wetting agent; silver is even better—which accounts for the enormous increase in the use of silver brazing and soldering alloys. Also, the silver solders will stand higher temperatures without melting loose than lead-tin solders could.

Silver is one of the few metals in the entire chemical table that has a combination of chemical, metallurgical and physical properties that can make a major industrial metal, and is, in addition, sufficiently plentiful for full use. Tens of thousands of tons of the metal are available in the world, and in the rocks of the Earth's crust. The United States has large resources of its ores. Any technologist could readily predict that it would become an ever more important, ever more widely used material. The increasing industrial use would, naturally, lead to improved and expanded mining methods, lowered costs, and greater use.

Unfortunately, the technologist would be wrong. Some people think silver is money. The Silver Bloc does. They may fear that if silver mining is expanded it may become so important an industry as to surpass the noodle business. They seem to be afraid that, if silver is released for use in bomb fuses, bomber and tank parts and such war-industry uses, that people may get the idea that, unlike gold, silver is an exceedingly versatile and useful industrial material.

THE EDITOR.

Make me Prove

THAT I CAN TRAIN YOU AT HOME FOR A Good Job in Radio

I TRAINED THESE MEN

Mail the Coupon for a FREE lesson from my Radio Course. It shows you how N.R.I. trains you for Radio at home in spare time. And with this sample lesson I'll send my 64-page illustrated book, RICH REWARDS IN RADIO. It describes the many fascinating jobs Radio offers. Explains how N.R.I. teaches you with interesting, illustrated lessons and SIX BIG KITS OF RADIO PARTS!

Act Now! Many Radio Technicians Make $30, $40, $50 a Week

Right now, in nearly every neighborhood, there's room for more spare and full time Radio Technicians. Many Radio Technicians are stepping into FULL time Radio jobs, or starting their own shops, and making $30, $40, $50 a week!

Others are taking good-pay jobs with Broadcasting Stations. Hundreds more are needed for Government jobs as Civilian Radio Operators, Technicians. Radio Manufacturers, rushing to fill Government orders, need trained men. Aviation, Police, Commercial Radio and Loudspeaker Systems are live, growing fields. And think of the NEW jobs Television and other Radio developments will open after the war! I give you the Radio knowledge required for these fields.

My "50-50 Method" Helps Many Make $5, $10 a Week EXTRA While Learning

Many N.R.I. Students make $5, $10 a week extra money fixing Radios in spare time while learning. I send EXTRA MONEY JOB SHEETS that tell how to do it!

My "50-50 Method"—half building and testing Radio Circuits with the six kits of Radio parts I send, half learning from illustrated lessons—makes you "old friends" with Radio before you know it. You run your own spare time shop, get practice fixing friends' Radios, get *paid* while training!

Find out What N. R. I. Can do for You

MAIL COUPON NOW for FREE sample Lesson and 64-page illustrated book. You'll see the many fascinating jobs Radio offers and how *you* can train at home. If you want to jump your pay—Mail Coupon AT ONCE! J. E. SMITH, President, Dept. 3AD, National Radio Institute, Washington, D. C.

$10 a Week in Spare Time

"I repaired some Radio sets when I was on my tenth lesson. I really don't see how you can give so much for such a small amount of money. I made $600 in a year and a half, and I have made an average of $10 a week—just spare time." JOHN JERRY, 1337 Kalamath St., Denver, Colorado.

Lieutenant in Signal Corps.

"I cannot divulge any information as to my type of work, but I can say that N.R.I. training is certainly coming in mighty handy these days." (Name and address omitted for military reasons.)

$200 a Month in Own Business

"For several years I have been in business for myself making around $200 a month. Business has steadily increased. I have N.R.I. to thank for my start in this field. ARLIE J. FROEHNER, 300 W. Texas Avenue, Goose Creek, Texas.

Extra Pay in Army, Navy, Too

Men likely to go into military service, soldiers, sailors, marines, should mail the Coupon Now! Learning Radio helps men get extra rank, extra prestige, more interesting duties, MUCH HIGHER PAY. Also prepares for good Radio jobs after service ends. Hundreds of service men now enrolled.

TRAINING MEN FOR VITAL RADIO JOBS

GOOD FOR BOTH 64 PAGE BOOK SAMPLE LESSON **FREE**

MR. J. E. SMITH, President, Dept. 3AD
NATIONAL RADIO INSTITUTE, Washington, D. C.

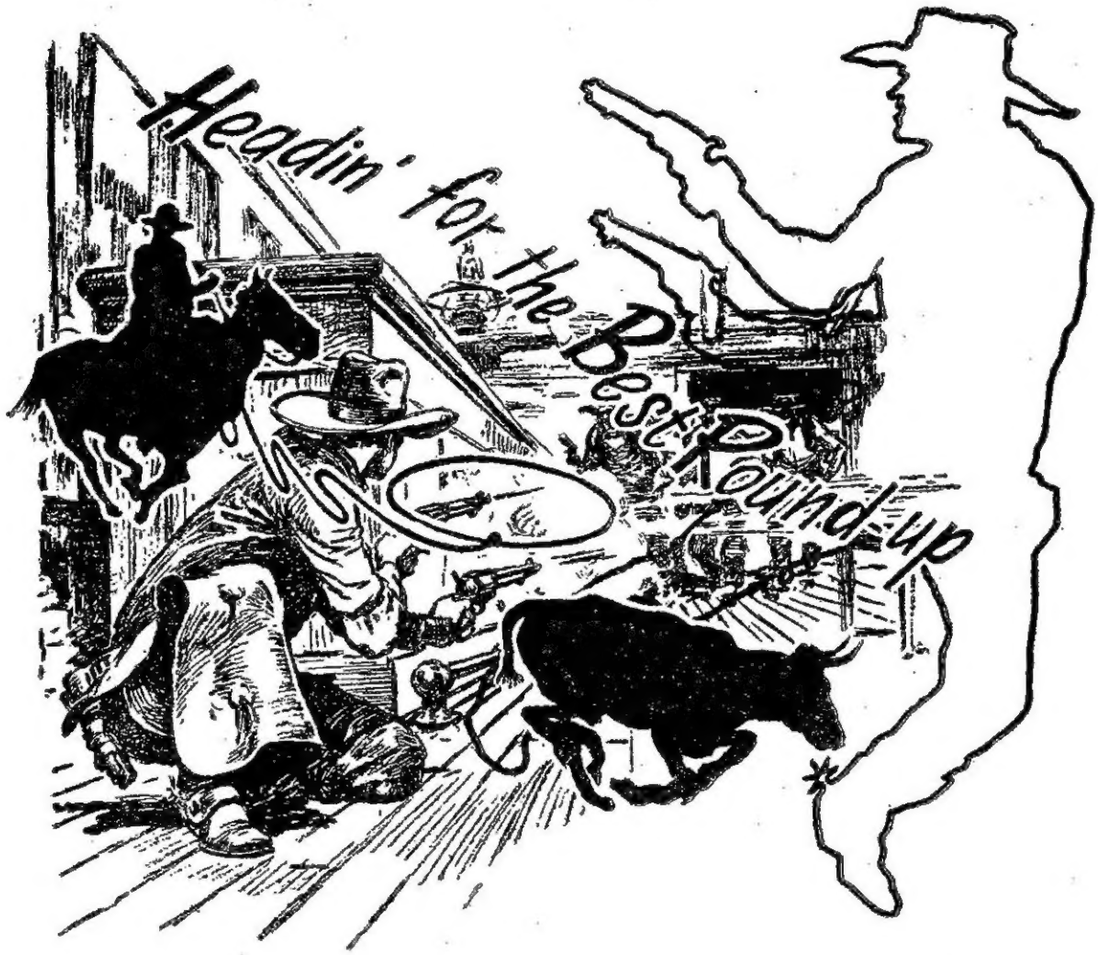
Mail me FREE without obligation, Sample Lesson and 64-page book "Rich Rewards in Radio." (No Salesman will call. Write plainly.)

Age.....

Name .....

Address .....

City..... State.....2FB



of Western fiction ever corralled between covers!

It's Street & Smith's new WESTERN STORY ANNUAL, containing five novels and two novelettes by top-hand authors!

The list includes Walt Coburn, L. L. Foreman, C. K. Shaw, Bennett Foster, Peter Dawson, Harry Sinclair Drago and Ray Nafziger—represented with the best stories we have ever published!

Get your copy now—but if your dealer can't supply you, fill out this coupon. It's only a quarter—thirty cents in Canada.

Western Story Annual 1943

25c A COPY 30c IN CANADA AT ALL NEWSSTANDS

WESTERN STORY ANNUAL
79 SEVENTH AVENUE
NEW YORK CITY

Inclosed is 25c (30c in Canada). Kindly send me a copy of WESTERN STORY ANNUAL, 1943.

NAME.....

ADDRESS.....

CITY..... STATE.....

THE WEAPON MAKERS

By A. E. van Vogt

***FIRST** part of a three-part novel of one man—currently calling himself Captain Hedrock—against the two greatest powers in the whole Solar System—the Isher Empire itself, and, simultaneously, the vast, secret power of the Weapon Shops.*

Illustrated by Kramer

I.

A whole year had passed. The trail, Neelan thought, would be—*cold!*

He sat, letting the rhythm of the superbly swift trans-State plane soothe him. It had not been his fault that he couldn't get to Earth sooner. The meteorite, where Carew and he had been doing the preliminary work on their strike of "heavy" beryllium, had just entered the Dead Spot, the extreme opposite side of the Sun from Earth when the knowledge had come that Gil was dead.

For nearly a year, the meteorite, its velocity almost matching that of Earth, had maintained its remote position. Finally, however, a point had been reached where it was possible to figure out an acceptable orbit for Carew's and his simple type freighter.

Carew had landed him at one of the less expensive spaceports—the paired-atom beryllium mine might be worth its weight in platinum, but it wasn't paying yet—and so, after twelve months, he was on his way to Imperial City to find out how his brother had died.

In his pocket were a hundred credits, the remnants of the large stake he had sunk into the meteorite mine. He'd probably have to get a temporary job or—he made a *moue* of distaste—go back to gambling.

For a while, Neelan stared down at the distant, green land, at towns and cities that flashed by like gorgeous gems from an unending emerald setting.

Suddenly, he was trembling. To think that he had been away from all this for ten years. Ten years! Actually to have deserted dazzlingly fertile Earth for barren Mars, the drab moons of Jupiter, and finally an airless meteorite!

What fools men were! They—

Careful, Neelan thought grimly. It was just as well to remember that life on Earth under the ever-glorious Empress Isher was not all harmony and beauty. After all, he *had* had a reason.

The thought jarred. It was like a signal to his mind. It brought memory of the sharp emptiness that had come to him out there in space a year ago, his first knowledge that Gil

was dead. Acute awareness it had been of the lack of that neural pressure which had constituted, even at that distance, the bond between his brother and himself.

There had been pain, Neelan remembered uneasily. Gil had died in agony, suddenly, without expecting it. The anguish had bridged the multimiles between Earth and the meteorite and twisted his own nerves in dreadful sympathy.

They had often wondered, Gil and he, and the scientists, what it would be like for one to die. The scientists had taken them at the age of five, identical twins already sensitive to each other, and magnified the sensitivity until it was a warm interflow of life force, a world of dual sensation.

The interrelation had grown so sharp that at short distances—a few thousand miles—thoughts passed between them with all the clarity of the electronic flux in a local telestat.

Those earlier years had been pure joy of intimate relation; and then at the age of twelve began the attempt to make them different without breaking the nervous connection. Like a kid tossed in to sink or swim, he was subjected to the full impact of Isher civilization, while Gil was secluded, confined to studious ways.

Over those years, their intellectual association declined; thoughts, though still transmittible, could be concealed. Neelan developed a curiously strong, big-brother attitude toward Gil, while Gil—

It was Neelan who noticed the diffident manner in which Gil tackled adulthood. Gil's way of life had made him shy, retiring. He could go all out on his job as research worker, but only too clearly the knowledge that his brother would automatically share all his emotional experiences made him hopeless socially, especially with women.

There was never any question as to who would leave. On the day that the contract with the Eugenics Institute terminated, Neelan announced that he was leaving for Mars. Gil was going to have his chance at life. Only—

Only it had been death—

Reverie ended. Neelan's tautness faded before the spectacle that was unfolding below—the beginning of Imperial City. Mile on mile of suburbs reeled past, bright shiny little places, each in their park setting, linked to the greater whole by a lacework of roads.

Minutes later, he climbed out of the airliner onto the skyscraper roof that was the landing ground. He wasted no time, but put through his call immediately to Information Library. The answer came after considerable delay:

"—We have no record of a Gilbert Neelan dying in Imperial City on the day you mention, or on any other day during the past two years. Furthermore, a checkup with the Planetary Statistical Bureau has failed to reveal his name on the lists of the dead.

"However, it is clear that our records must be inaccurate, as he is not registered in this year's planetary directory. His last known address was 1674 210th Avenue, Center, Imperial City, but that is according to last year's records. Will you please tell us how you learned of your brother's death—"

Neelan said hastily: "I'll get in touch with you later."

He broke the connection, walked to the nearest edge of roof, and stood for a long moment looking down at the mighty city.

At least he had one fact: The Information Library's record of Gil's address was the same as had been on Gil's last letters. He would go there first, and then—

He had a sudden dark sense of destiny.

II.

Darkness was settling over the ancient city when Neelan stepped out of a public carplane, and looked around. It was a street of what had once been fine residences. *The* house was equipped with an all-directional sign, already beginning to glow, which read: "Rooms to Let."

The doorbell was answered by a primly dressed little maid, who returned after a moment with a fine-looking, buxom young woman of about thirty-five.

The woman frowned thoughtfully as Neelan explained his mission, then she shook her head. She was sorry, but while the name did somehow seem vaguely familiar, she really couldn't remember any Gilbert Neelan having stayed in her house. Perhaps if she looked at her accounts she might recall something. His knowing that it was Room 3, and up to July 17, 4790 Isher, just a year ago, would help.

And of course she'd be glad to let him have a room for himself. They were lovely rooms and just one credit a night. Wouldn't he come in?

He'd enjoy staying here. There was a con-

stant coming and going of new roomers; had been ever since she was widowed three years ago. Life was too rich, too wonderful to spend it in mourning. She liked change, variety—

She rambled on, sitting down on the edge of the bed with her accounts. Neelan made an effort to silence her agile tongue. He sat with a twisted smile on his lips, letting the gathering consciousness of the defeat that was here sink into his mind.

On the very first leg of his search, he had run into quicksand, a bottomless well—a rooming house owned by a vague-minded creature to whom every boarder was a person dimly seen, important only in that such and such a room paid its way.

This poor woman with her desire for a steady stream of new roomers, new faces—what a strange restlessness it showed. What was it that Weapon Shop man on Europa had called it—a twisted, uncomprehended impulse toward rebellion against stability, a manifestation of the adventurous spirit of a dissatisfied era.

Neelan shrugged gloomily. Perhaps the woman—what was her name? Dendley; perhaps Mrs. Dendley was right. Life was too wonderful to spend it in mourning, or in searching, for the dead.

And Gil *was* dead. It wasn't just a matter of mixed records, or of mystery. He, Neelan, had felt the hideous flash of pain; and then the utter black-out of nervous connection. It had been fast, a matter of seconds; no sickness could ever have struck like that.

Death had come through accident or—murder!

The thought was not new. It was one that had racked him during all those long months of waiting on the meteorite. The very idea of Gil struck down in some dark byway was—

An exclamation from the woman jerked his mind back to her. "Why, yes," she said, "I remember now."

Neelan stared at her, wide-eyed, as she went on: "He's *that* one. No wonder I couldn't recall him."

She paused; and the shaky thought came to Neelan that, while there was probably a law against turning landladies upside down, and emptying words out of them, it— Before he could speak or think further, Mrs. Dendley said:

"He kept some luggage here because, as he said, he had to conform to the strict home-address regulations. He even gave me permission to rent his room overnight, but not for any length of time, if you know what I mean. I—"

"You mean"—Neelan felt blank—"he didn't really live here?"

The woman nodded brightly. "That's right. He came in once a month to collect his mail and pay the rent. He said his work made it necessary for him to sleep at his place of business."

She was looking down at her book. "I never knew where he worked, and he checked out on July . . . let me see . . . yes, July 17th. That'll be a year ago last week."

Neelan nodded, but his muscles were so rigid that the movement hurt his neck. He straightened finally, consciously nerving himself to face the tremendous fact:

So Gil had left here deliberately—on the day he died.

It seemed a start. For surely somewhere in the city someone would know something.

Illusive hope! The trail, instead of widening and brightening, grew narrower, more obscure. When he called at the Eugenics Institute, he was informed that it would be necessary to obtain the case history from their Lakeside branch, and that would take a few weeks. No, they had had no local correspondence with his brother.

The police publicity agent said: "Do you know that we've had five thousand unsolved murders in the past two years? This is one of those curious periods in history when assassination is almost respectable, and one more murder is like a stone thrown into the dark. A year ago, you say? Forget it!"

No bank in the capital had any record of a Gilbert Neelan account. There was a bank balance of several thousand credits at Lakeside, and if he would apply to the courts—It would take about six months.

The Atomic Research Corp. reported that Gil had left his post in their great Lakeside branch two years previously, with the purpose of joining a private firm in Imperial City. They didn't know what firm. No application had ever been made for references.

His work? He had been engaged in establishing a stable relationship between terrene and contraterrene matter, a well-explored field, completely lacking in recent sensational developments.

Two half-minute telestat ads succeeded only in reducing Neelan's fading capital by

sixty credits. At the end of three weeks he had paid Mrs. Dendley twenty-one credits for rent, and spent another sixteen credits on food, carplane fare, and person-to-person telestat calls.

On the morning of the twenty-first day, a woman from the Eugenics Institute called up and informed him that the documents of Gil's and his case history had arrived from Lakeside, but had yielded nothing of value. But would Neelan come in person at five o'clock that afternoon. The executive professor, Nad Rayburn, would like to speak to him.

After disconnecting, Neelan stood frowning beside Mrs. Dendley's telestat. He remembered the professor from his first personal call, a distinguished-looking, friendly graybeard.

He'd go all right, he decided grimly. But on the way he'd take time off for something more urgent. A man with less than three credits to his name had better start thinking in terms of making money—and fast.

He went out for lunch—and then forgot it. He walked restlessly. The afternoon was half gone before he remembered food again. Eating it in a small Self-serve, he felt his basic indecisiveness, the empty sense of all the time that had passed, the months that had drawn so many curtains across the death trail.

And now his search must wait even longer —while he made some money.

What a laugh that was. In about three months, the "heavy" beryllium mine would start to pay at the rate of a hundred thousand or so credits a month while he—very *un*funnily —was in serious danger of having to get into a soup line, and so automatically qualify for permanent exile to Mars or Venus, where there was always work of a sort.

Out in the street, Neelan stuffed a coin in a corner PUBLIC AD machine. "Technical?" he said, when a girl's face appeared on the plate.

An older man replaced the girl, and Neelan said: "I have the following general qualifications—" He outlined his education and experience: atomic engineering degree, three years meteorite mining— "I want to emphasize," he went on, "that I do not wish to sign the usual two-year contract. I want a job distinctly temporary, two months at the outside. Have you anything?"

"I'm afraid," the clerk said, "such positions are all of a lower classification. The industrial contract, where the firm has to retain you six months, and *you* have to remain two years, is a business tradition. Besides, the powerful Engineer's Guild would not permit employment except under such terms."

"What do you mean," Neelan asked, "by lower classification?"

"There's an ad here," said the clerk, "that's been running for five days, and was renewed this morning by registered telestat. I'll read it to you:

"Wanted: Man capable of repairing large atomic motors. No Automatic Repair trainees need apply. Call in person, Room 1874, Trellis Minor Building. Good pay.

"The unique feature about that ad," the clerk said in his precise voice, "is that it requires special training in a trade that is almost nonexistent in large cities, but which you would have learned in the course of attaining your degree. The Automatic Repair machines, with their cheap, fast jobs, have forced the old hand craftsmen out of business for sixty years now. Apparently, someone wants the superior, longer-lasting repair job.

"I would say that ad was your best bet. I have here a number of other trade-type positions that—"

Neelan noted them down, as they were described. When finally the machine clicked off, he felt surer of his future. Something ought to materialize from the list; and, as the clerk had said, the first job was the most promising. The next morning would prove or disprove its merits. Meanwhile—

The Eugenics Building was a gray-white shaft that pierced a thousand feet of sky, narrowing as it went up, and finally tapering sharply to a point.

Neelan stepped off the elevator at the ninetieth floor, and was admitted immediately to the office of the executive professor. The man stood up graciously from behind his desk, and, leaning over, shook hands. He said then:

"It is regrettable that we have been unable to assist you directly. Unfortunately, your brother's last communication to our Lakeside branch dealt with an obscure nervous disorder that proved to have no relation to our sensory investigations. That was five years ago."

Neelan said: "Thank you for your efforts on my behalf."

Quite suddenly, puzzlement came. It hadn't struck him before, but abruptly it

seemed odd that he had been invited up here for a few polite words of regret. He stared sharply at the man, and was startled to see that the other was regarding him intently from under bushy eyebrows.

The old man caught his glance, and laughed shortly. "I'm wondering," he said finally, coolly, "if you're still as reliable as you were when you passed from out of our responsibility ten years ago."

Excitement touched Neelan. For here was —something.

"I would like," the scientist went on, before Neelan could speak, "to make a suggestion, in the strictest confidence, as a friendly gesture to one of our former wards."

Neelan fought tautness, as he said: "You can trust me; I swear it."

He waited tensely, as the old man's fine, gray eyes burned into his own, steadily, for a long moment. At last—

"Why don't you," said Professor Rayburn, "try the Weapon Shops? It is not generally known, but they have an Information Center that has no equal. And now good-by and good luck."

He turned away, without looking at Neelan, and busied himself with papers on a side desk.

Neelan's mind was still jumping as he reached the street. Because he hadn't known. He thought: "And I believed they only sold guns. I should have known. Why, I've been all over the solar system, been in several of their shops, had long conversations with that fellow on Europa—"

He felt torn; his personal despair yielded briefly to a sense of immense things, the utter tremendousness of the Weapon Makers establishment, with its stores existing in tens of thousands of cities and towns in the far-flung Isher Empire, an independent, outlawed, indestructible, altruistic opposition to tyranny.

He should have known, of course, that they must have an *inner*, hidden establishment that served the outer, visible one. Thinking about it, he had a sense of lift; the burden of his search seemed less of a weight on his soul.

The Weapon Shop was in a glade of green and floral vegetation; it made a restful, idyllic picture between two giant buildings. The great, universal sign of the store told its old, old story to all who cared to see:

THE RIGHT TO BUY WEAPONS IS THE RIGHT TO BE FREE

The window sign was the same, too, as in all the shops he had seen. The letters were smaller, but the words were just as positive:

THE FINEST ENERGY WEAPONS IN THE KNOWN UNIVERSE

Neelan stood very still, staring at the gleaming display of revolvers and rifles. It wasn't that there was anything new here. For years he had carried one of those marvelous, defensive guns. The weapon was in place now, fitted snugly in its holster under his left shoulder.

Seven times, in the days when he had lived by his remarkable gambling luck, that supergun had flashed its abnormal power. No, definitely it wasn't the newness. The only thing was—

The very sight of a Weapon Shop always gave him an eerie sensation. It required a distinct mental *reaching* to realize that every Weapon Shop was an impregnable fort, and that bloodily earnest attempts had been made by the Isher government in long-gone years to smash the entire organization—unreal picture, amazingly hard to visualize.

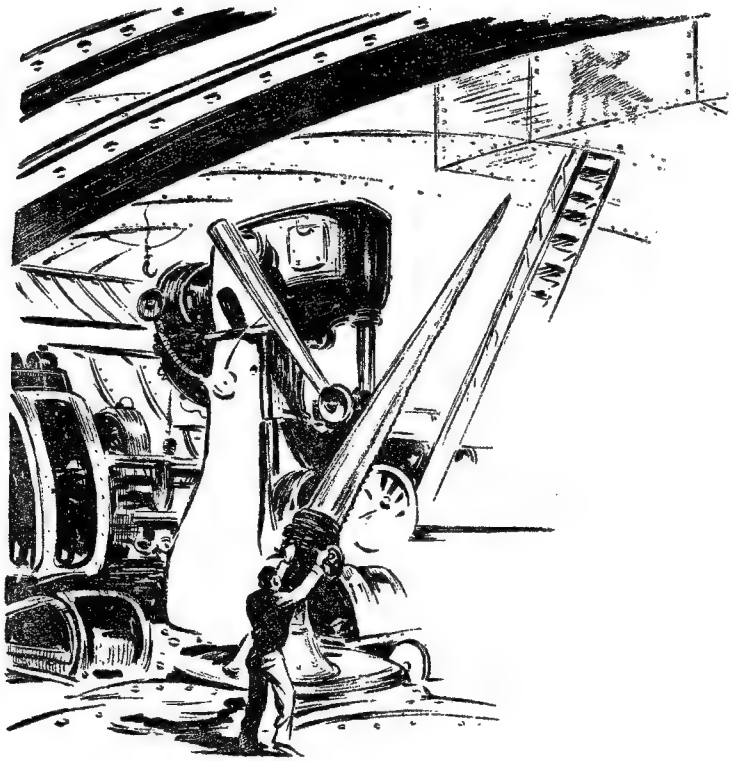
Neelan shook himself, and walked toward the door. It wouldn't open. He tugged at it, startled, thinking: Was it possible that the sensitive door was condemning him because he had so recently come from a government institute? Report said the door worked by thought; and no enemy of the Weapon Shops, no servant of the Empress Isher, was ever admitted. It—

It opened gently like a flower unfolding its petals, only faster. It was weightless in his fingers, like some supernally delicate structure insubstantial. And when he stepped through the opening, it crowded his heels without touching them, and closed behind him silent as a night in space.

Neelan stepped gingerly through a little alcove into a large room. Dimly lighted region it was, with wall and floor showcases, not many, but neatly arranged.

A tall, middle-aged attendant emerged after a moment from behind double doors that led to a briefly seen, brilliantly lighted back room.

Neelan explained his mission. The man went to a metal desk that stood against the back wall, and seated himself before an "endless" sheet of paper. The paper came out of the wall, and then went down a slit into the



desk over a roller. The man wrote Gil's full name, and connecting information.

The paper with the writing rolled out of sight into the desk. They waited.

Five minutes passed, then the paper rolled back out of the desk. There was more writing below the original. The attendant studied the message with pursed lips, then he looked up and said:

"Take down this address: 1997 232nd Avenue, Center, Imperial City."

Neelan's fingers trembled as he wrote. His mind was twisting. His body felt like liquid. He said in a wavering voice:

"You don't mean to tell me that you've actually got his last address? What kind of wizards are you? What—"

He couldn't go on; he listened as in a dream, as the man went on:

"There are some unusual angles in the case. When your brother came to Imperial City, he went to live and to work at that address. The building is owned by a famous scientist, named Derd Kershaw, a great and thoroughly honest man. It is, and remains, our policy never to pry deeply into the affairs of such personages. For this reason, at the time, the bare details of your brother's residence were noted, and that was all. However—"

He paused; then: "In view of the fact that your brother is now dead, it has been decided to go further into the matter. Unfortunately, it will be at least a week before an observer can be assigned to the task. I would advise that you take no personal action in the meantime, as our investigation will be immeasurably more thorough than anything you could possibly manage."

His eyes were steady on Neelan's. "I must emphasize that we are not taking your case in any police sense of the word. We do not punish crimes. We do not interfere with the great flow of Isher life, except under certain conditions where money is involved."

He finished: "Come back in eight days, and we will give you further information. That is all. Good-by."

Neelan was out in the street before it occurred to him that he hadn't so much as offered a single word of thanks.

Night was falling over the city of dreams when Neelan stepped off the public carplane in front of Mrs. Dendley's. A night made alive by lights that glowed softly from every crevice, and only the sky, the deepening blue of the sky was yielded to darkness.

He stood watching the lights of the carplane flicker into the upper shadows, then he turned and went into the house.

In his room, the high thrill of his success began to fade before a new reality: So he knew where Gil had worked up to the time of his death! So what?

He knew where a man now dead had worked!

It was startling to picture it that way. He thought: "Am I crazy? What am I looking for? Just because Gil and I were like two facets of the same form, why should I ruin myself simply to find his body? He's *dead.* Irrevocably. I've got to get that deep into my head."

The thought disturbed vastly. He felt, suddenly, the immeasurable unimportance of one life, one man dying somewhere, darkly, his body silhouetted for a cosmic instant against the horizon of time, and then plunging down into the night, another brave spirit lost among the hosts of Earth's dead.

Unsettled, he walked to the window. The house stood on a great rise; and so it was possible to see across the ocean of buildings to the distant sea of lights that was the "downtown," with its Avenue of Luck, Boulevard of Fun, and Street of Shows.

Far to the right, he could just make out the Imperial Palace. For weeks of nights, the dazzling, crystalline structure had scarcely more than touched his attention. Now, suddenly, it caught his mind and his eyes.

The empress! Mentally, he pictured her: imperious young woman in the full fire of her power and youth. The glorious Empress Innelda Isher, not an angel from what he had privately heard but—

Whatever she was, she was the epitome of the lusty life that was out there under the six hundred square miles of blazing lights that was Imperial City, while he—

He was sunk here in the contemplation of death.

Slowly, Neelan straightened. It was over, he thought—his search. Tomorrow, he would obtain his job. During the noon hour, he would take a ride over to the address the Weapon Shop had given him and, well, look the place over.

He wouldn't go in, but would wait the eight days that the Weapon Shop man had suggested, wait for their report.

He went to bed on that thought and dreamed that Gil was alive on a burning hell of a desert, choking, suffocating, in a perpetual blast of unearthly storms.

He wakened, sweating; and saw that a cheerful sun was shining through the great window. Slowly, under the effects of an invigorating shower and the brightness of the morning, his body relaxed. Mentally, he renewed his determinations of the night before.

It was cool outside, almost bracing on the shaded side of the long, broad boulevard. Neelan crossed to the sunny side, and that made a difference.

The thought came that the sidewalk mechanism had been reversed too quickly. There was, of course, the fact that the more day's heat the streets absorbed, the more light they gave off at night, but after all the light was always augmented by atomic power, so—

Walking warmed him gradually, and he forgot the problem of temperature completely, as a vast, hundred-story building loomed up ahead of him.

TRELLIS MAJOR BUILDING

For a moment, the wrongness of the name did not strike Neelan. He quickened his pace, and stopped only when, across the street from the stupendous structure, he saw the smaller, fifty-story, spired monster that was the Trellis Minor Building.

The sight jarred his memory. Of course. Trellis Major and Minor were two meteorites revolving around each other somewhere beyond Mars. The larger was terrene matter, the smaller contraterrene. They were being mined assiduously by a single company; and these massive buildings were but two by-products of the still unended treasure that flowed in a steady stream from that remote region of solar space.

Some day Carew and he might have a build-

ing, or buildings, like this for that three-mile-in-diameter meteorite of theirs.

The mental picture was pleasing; and it occupied his mind so completely that he was stepping into the elevator before another thought struck him:

Funny, an atomic motor repair company in a building. The law was utterly strict about isolating the power tools involved—requiring a special type of wall and floor material, and at least fifty feet of fenced-in ground on all sides. Impossible here!

Obviously, then, this must be only an office; his actual working hours would be spent elsewhere. He knocked thoughtfully on the door of Room 1874—and waited.

Two minutes of intermittent knocking produced no results; and, frowning, Neelan stepped back and surveyed the impassive, opaque entrance. It was one of a long line of similar doors on the eighteenth floor, and he'd be hanged if he'd give up without a further effort. Before he could knock again, a harsh voice from inside said:

"Come in."

Neelan's fingers were turning the knob, and he was pushing the door open, before he remembered that the door had been locked when he had first tried it.

So the lock was remotely controlled—

Just inside the door, he stopped short. He was in a large room with a massive bulging window. There was no other door, no other room. A telestat stood blank and lifeless in one corner. There were four chairs and a desk and—nothing else.

There was no one in the room.

Like a discharged gun, Neelan's mind flashed straight at the only possible source of the harsh voice that had invited him inside.

Straight at the unlighted telestat in the corner, he said:

"What's the idea?"

There was silence. Neelan was about to speak again, when the voice that had invited him in, snapped from the telestat: "Who are you? What's your name?"

Neelan's impulse was to walk out. The sharpness of the man's tone jarred on him. The whole affair seemed suddenly decidedly fishy and—

The only thing was: his urgent need for money. Damn it, he couldn't just walk out. He laughed ruefully, gave his name in his steadiest voice.

"What do you want? How did you come here? How did you find this place?"

The first real impatience touched Neelan. What kind of an idiot was he dealing with? But again his own urgencies held his tone to a quiet level, as he explained about the ad, his qualifications for the job, and the length of time he was willing to work.

He did not mention Gil, or any of his reasons for being on Earth. When he had finished, there was a long silence; finally:

"I guess you'll do."

"Thanks," said Neelan dryly.

"You must," said the voice from the telestat, "be wondering the why of this queer method of employment."

Neelan shrugged. "I did. But I don't really give a damn."

The man laughed, not too pleasantly. "I'm glad to hear that. I've got a job that will take just about two months; and I'll pay you a hundred credits a week, and no questions asked. How's that?"

Fishier and fishier, Neelan thought. Even with hand craftsmen as scarce as they were, that was about double what the job was worth. He shrugged, and said:

"I'll be too busy repairing motors to worry much about anything else."

He felt remote from the petty illegality that seemed to lie behind this. Remote, and conscious of his own need. He grew aware that the stranger had been speaking, and that he hadn't been listening. The man was saying:

"—So come up at once. I'll show you the general layout before lunch. All right?"

Neelan said: "Will you repeat the address while I write it down?"

The voice rasped: "Five blocks north along 131st Street. Then about one block east to 1997 232nd Avenue, Center. It's a tall, narrow, grayish building. You can't miss it. Ring the bell, and wait for an answer. Got that?"

There was something in the back of Neelan's mind, an indistinct something that tugged for his attention but faded as he realized that the man was waiting for an answer. Neelan looked up impatiently:

"Yes," he said, "yes, I'll be there."

He was out in the street before the something in the back of his mind came out of its dark.

He stopped. His mind jangled. And then he had his note book out and was feverishly

leafing it over to the address the Weapon Shop had given him.

For a moment, then, it seemed to him that there was a fatal flaw in the physical structure of his brain; and that flaw was now cracking under pressure.

Because the two addresses—the one where he was going, and the one where Gil had worked before his death—were the same.

He couldn't get over it. The shock continued to beat at him, as he walked. And it did not fade, but grew. After two blocks, Neelan leaned, trembling, against a building.

He was so weak that he felt sick. He was about to force himself on when another thought swept him with the violence of a tidal wave.

The man had recognized him. Or rather *recognized his resemblance to Gil.* That was why his voice had been so unnaturally sharp. That was why he had been silent for such long intervals. He must have been thinking of what might lie behind the appearance of Gil's brother, applying for a job whose origin had been so skillfully concealed.

He must have been nearly startled out of his wits. And that meant—

Neelan's mind simply would not reach out to grasp the implications. For over and above everything else was the fact that the stranger had recovered a semblance of reason and asked him to come up. *Urged* him.

The grisly sense of danger that came in that moment was like a physical blow. Quite literally, he braced himself; all his muscles tightened like drawn wires.

"Am I going up there," he thought shakily, "without telling anyone where I'm going? It's true, I've got a remarkable defensive gun but—"

There was the further fact that the man might become suspicious if he didn't arrive within a certain time. Nevertheless, one digression shouldn't—

Swiftly, he walked to the nearest carplane stop, and pressed the button. A machine swooped down out of the sky.

The Weapon Shop door opened at his touch, without offering an instant's resistance. The attendant came forward, recognition in his gaze. He listened thoughtfully while Neelan explained what had happened. Finally, gravely, he shook his head.

"I'm sorry," he said, "that you failed to appreciate what I told you before: The Weapon Shops do *not* interfere in the affairs of individuals, except under certain circumstances that do not apply here.

"Overwhelmingly, our business is that of selling guns to men who have the will and courage to protect themselves and their rights against tyranny. In the final issue, it is the maintenance of that spirit of resistance that is our concern during any given generation or century.

"My advice is: wait until one of our observers can be assigned to the case. Unfortunately, all our available men are engaged upon a task of the utmost importance, and under no circumstances can they be shifted. I can see the importance of what has happened. The man who talked to you does not sound like Kershaw but"—he shrugged—"I'm sorry."

To hell with the Weapon Shops, Neelan thought grimly, as he sat in a carplane on his return journey. Seven more days before one of their men would be free; and even then, no matter what they discovered, they wouldn't take any action. Such cosmic detachment might have a long-run practical value, but it didn't mean a thing now.

And there was no time for further delays; his strength lay in the fact that the man, whoever he was, did want a job done. Still—

Frowning, Neelan climbed off the carplane within a block of his destination. There was a store across the street; he went in, bought an envelope and a sheet of paper, and wrote a brief note to Professor Nad Rayburn. The note stated the facts as simply as possible, and ended: "If you fail to hear from me by tomorrow noon, get in touch with the police."

He mailed the letter; and then, satisfied, he headed along the street. It was, he saw by his watch, exactly thirty-one minutes since he had talked to his—employer. Not too long.

So that was the building! Neelan stopped, and stared. It was a queer, ungainly structure in that it was out of proportion, much too long for its width. Like a great, gray-dull needle it poked into the lowering sky three, four hundred feet, a curiously sinister construction.

There was no sign outside it to indicate what went on inside, simply a narrow walk leading from the sidewalk to a single, unimposing door that was level with the street.

He pictured Gil walking along this street on the day of his death, striding forward up to the door, disappearing inside. The thought

stiffened Neelan as he rang the doorbell.

A moment passed; then: "You took your time about arriving," said the familiar voice from a hidden speaker above the door.

Neelan said steadily: "I walked straight here."

There was another brief silence. Neelan thought: The man must be thinking that over, mentally measuring the distance from the Trellis Minor Building. Finally:

"Just a minute."

The door began to open. Neelan saw a wide, high alcove, just how high he couldn't make out from where he was standing. He forgot the alcove as he found himself staring at a thick, partly open door made of dark, mottled metal. The entire inner wall, in which the big door was set, was smoothly wrought in the same metal.

Neelan was stepping through the outer door when it struck him with a horrible start what the over-all, unnatural effect was.

The inner wall was Fursching steel, the structural alloy that was used almost exclusively for the superhard shells of spaceships.

The strange building was a hangar for a spaceship. And the ship was *in*.

The shock of the discovery smashed along every nerve of Neelan's body. He drew back like a man who has unsuspectingly picked up an innocent-looking rod, only to find that it was a white-hot, hellish thing.

"What's the matter?" said the harsh voice. "What are you waiting for?"

The words stirred Neelan. He tried to force himself to walk in. And couldn't. He stood there, his brain feeling too big for his head with the thought that was swelling in it.

Gil had died, not on Earth, but in a flight through space. It was—

The reality of what the man had said struck him again, more sharply this time. It brought the piercing realization that his hesitation was ruining him. The time for dissembling was already long past. Only the truth could begin to explain why he was standing here like a clod of wood. He found his voice:

"I've just discovered that this is a spaceship."

"Oh!" There was silence; then the voice said urgently: "Just a minute. I'll be right out. I'll prove to you that everything is all right."

The annoying thing to Neelan was that he didn't suspect. Not that it would have made any difference. He was going in, regardless. But—to stand there, feeling in partial control of the situation with his Weapon Shop revolver snugly ready in its holster; and then—

The inner door, that had been fractionally open, swung wide. It revealed a third door, which was also open, and, beyond that, floating in the air, was a mobile energy gun, mounted and riding easily on antigravity plates.

The three-noded muzzle of the gun pointed with a mechanical steadiness at Neelan. From an inner speaker, the man said in a tight, hard voice:

"With your experience on the planets, you probably carry a Weapon Shop gun. I hope you realize the futility of such a weapon against a ninety-thousand-cycle unit. Just toss your revolver through the door."

There was nothing else to do. And it was as the revolver struck the floor inside that a tall man came into view. He scooped up the viridescent little instrument, and then faced Neelan from behind the mobile unit.

"Come on," he said curtly.

Without a word, Neelan stepped through the two inner doors, each one of which, in turn, clanged behind him with heavy finality.

III.

Almost, Hedrock forgot the spy ray. It glowed on, the picture on the screen showing the Imperial conference room as cleverly as ever.

There were still men bowing low over the hand of the cold-faced young woman who sat on the throne chair, and the sound of their voices came distinctly. Everything was as it should be except—

For Hedrock, all interest in that splendid, shining room, that courtly scene, had shuddered into nonexistence. The icy words of the young woman spun around and around in his mind, though minutes had now passed since she had spoken them.

"—Under the circumstances," she had said, "we cannot afford to take further risks with this Weapon Shop turncoat. What has happened is too important. Accordingly, General Grall, you will, as a purely precautionary measure, arrest Captain Hedrock an hour after lunch and hang him. The time sequence is important as he will, as usual, sit at my table during lunch, and also because I wish to be present at the execution."

"Very well, your majesty—"

Hedrock paced back and forth in front of his viewing machine. He felt mentally and physically shattered, indecisive; and there was the clammy beginning of fear, for a thought, a grim purpose was in his mind, a hardening determination not to accept the failure that was here.

Very slowly, he faced again the spy-ray machine, which, in its present materialized form, occupied an entire corner of the apartment.

He saw, with a somber awareness, that the young woman was still in the conference room, alone now. She sat, a faint smile on her long face. The smile faded as she touched an instrument on her chair, and began to dictate in a clear, bell-like voice.

For a moment, Hedrock allowed the meaning of the routine palace matters she was discussing to penetrate his mind; then he withdrew his attention, and, very carefully, began to adjust his machine. The scene showing the young empress faded. The viewing plate flickered with formless light, finally caught the face of a man, and steadied.

Hedrock said: "Calling the High Council of the Weapon Makers."

"It will take a minute," said the man on the screen, gravely, "to bring the various councilors to their locals."

Hedrock nodded stiffly. He was suddenly jumpy, cold. His voice had been steady enough, but he had the feeling that it would deteriorate into a quaver unless he could pull himself together.

He stood very still, fighting that shakiness. When he looked again on the screen, a dozen faces had replaced the one, enough members for a quorum. He began at once an account of the sentence of death that had been pronounced on him, finished finally:

"There is no doubt that something big is up. Time and again during the last two weeks, when an Imperial conference has been called, I have found myself headed off into tedious conversations with superior officers, prevented from returning to my rooms.

"To my mind, however, the personally significant factor of the hanging order is the time element involved. Note that I am not to be arrested until an hour after lunch, that is, about three hours from now. And then, too, I was allowed to return to my rooms in time to hear the sentence pronounced. If they know the Weapon Shops, they must realize that, given three hours of warning, I have ample time to escape. Therefore—"

"Are you suggesting," said Councilor Peter Cadron sharply, "that you are going to remain?"

The putting of his unsettled intention into words startled Hedrock. The cold, stiff feeling came back; and when he spoke again, his voice shook the faintest bit, though the words themselves were precise and, in their essence, confident:

"You will remember, Mr. Cadron, that we have analyzed the empress' character. The abnormal sociotechnical pressures of the age have made her as restless and as adventure-minded as are her nineteen billion subjects. She wants change, excitement, new experiences, *but*—

"But above everything else she is the Imperial power, representative of all the conservative, antichange forces. The result is a constant tug of mind, a dangerous state of unbalance, which makes her the most difficult enemy the Weapon Shops have ever had."

"The hanging, no doubt," said another man coldly, "will supply a fillip to her jaded nerves; for the few moments that you jerk and bounce in the noose, her life will seem less drab."

"What I had in mind," Hedrock said steadily, "was that one of our No-men might resolve the various factors and advise on the practicability of my remaining."

"We will consult Edward Gonish," said Peter Cadron. "Now please have patience while we discuss this matter *in camera*."

They withdrew, not visually, for their faces remained on the viewer. But, though their lips moved, no voice came through.

The conversation seemed to go on for a very long time; and there was an almost endless period when something was being explained to somebody not on the screen. The time grew so long that Hedrock stood finally with clenched teeth and clenched hands, his muscles working, face contorted. His breath exploded from his lungs with a whistling gasp when, abruptly, silence ended, and Peter Cadron said:

"We must regretfully report that the No-man Edward Gonish considers that there are not sufficient known factors for him to offer an intuition. This leaves us with only logic, and so we wish to ask one question: At what time will your present chances of escaping from the palace begin to deteriorate sharply? Can you possibly stay for lunch?"

Hedrock held himself preternaturally steady, letting the shock of the report of the Noman's verdict drain out of him. Not for a moment had he realized how tremendously he was depending on that superbly trained intuitive genius to decide on *his* life or—death. In a single, flashing instant, the whole situation had become utterly uncertain, dangerous beyond his previous conception.

He shook himself, said at last: "No, if I stay to lunch I'm committed. The empress likes to play cat and mouse, and she will definitely inform me of the sentence during the meal. I have a plan, dependent on her emotional reactions and based on the fact that she will consider it necessary to justify herself."

He paused, frowning, stared at the screen: "What were the conclusions of your discussion? I need every possible assistance."

It was Councilor Kendlon, a thick-faced man, who had hitherto not spoken, who began:

"As you know, you are in the palace for two purposes, one being to protect the Weapon Shops from a recurrence of anything approaching the desperate danger we were placed in seven years ago when only the sacrifice of a man from the twentieth century, seven thousand years ago, enabled us to save ourselves from destruction.

"Your other purpose is, of course, your own pet scheme of establishing a liaison between the Weapon Shops and the Imperial government.

"You are a spy, therefore, only in a minor sense. Any lesser information you may gain is yours alone. We do not want it. But think back in your mind: Have you heard anything—*anything*—that might provide some fulcrum for your theory that something tremendous is being planned?"

Hedrock shook his head slowly, wordlessly. Quite suddenly, he felt no emotion, a sense of being physically detached. His voice came finally as out of a remote, cold region, precise, even, conclusive:

"I can see, sirs, that you have come to no decision, and you cannot even begin to deny that you are reluctant to have my connection here broken. And there is no doubt at all of your anxiety to learn what the empress is concealing. Finally, of course, there is, as you say, my pet scheme.

"Accordingly, I have decided to remain—"

They were not so quick as that to agree. The strange, restless character of the empress made it possible that the slightest wrong word on his part would be fatal. Details—details—they discussed them with a painstaking thoroughness.

There was the fact that he was the first apparent traitor to the Weapon Shops in history, one who nevertheless refused to give so much as a scrap of information to the curious ruler. His striking appearance, mental brilliance and strong personality had already fascinated her, should continue to do so.

Therefore, except for the dangerous fact that she was engaged in something secret and important, the threat of hanging was a test, product of suspicion. But be careful; if necessary, give her secret Weapon Shop information of a general nature, to titillate her appetite for more and—

At that point, the door buzzer broke off the conversation with all the finality of an explosion. With a start, Hedrock flicked off the controls, shut off the power; and then, acutely conscious that he had allowed himself to become jumpy, he deliberately removed his tie pin from the cravat, and bent down over the table.

The ring lay there, a small, bright design, its ornamental head an exact duplicate in miniature of the spy-ray machine, the image of which was built up into solid form by the atomic forces manufactured by the perfect power plant inside the ring.

Quite simply, he knew that it would be quicker to release the tiny, automatic lever that was attached to the ring for that very purpose, but his own nervous condition was more important. If he could steel himself to this—

It was as delicate a job as threading a needle. Three times his hand trembled the slightest bit, and missed the almost invisible depression that had to be contacted. The fourth time he got it. The spy-ray machine winked out like a smashed light, only there was no debris, nothing but empty air. Where it had stood on the corner table was only the blanket he had used to protect the gleaming table top from scratches.

Hedrock whisked the blanket back to the bedroom, and then stood for a moment with the ring in his palm, undecided. He put it finally in a metal box with three other rings, and set the controls of the box to dissolve the rings if there was any tampering.

Only the ring gun remained encircled on his finger when at last he walked coolly to answer the insistent buzzer.

Hedrock recognized the tall man who stood in the corridor as one of the empress' orderlies; the fellow nodded recognition, and said:

"Captain, her majesty asks me to inform you that lunch is being served, and would you please come at once."

For a blank moment, Hedrock had the distinct impression that he was the object of a practical joke, and that the abnormal woman was already playing her little thrill game. Lunch time! Why, it wasn't even—

The thought ended, as, automatically, he jerked up his hand, and stared at his wrist watch. The little dials showed twelve thirty-five, and that was like a special mind explosion. Incredibly, a solid hour had passed since he had heard the grimly uttered sentence of death from the empress' firm, finely shaped mouth.

With an enormous effort, Hedrock controlled his rising dismay, fought the sick, unpleasant feeling that time had stolen a march on him.

Actually, the question of whether or not he remained till lunch had never been his to decide. The event was rushing upon him even as he was telling the council that it was an hour away.

The reality of his position became ultimately clear as he walked along past scores of soldiers who stood in every corridor on his way to the royal dining salon; and that reality was that he was—staying.

It was so final that Hedrock stopped on the threshold of the great, brilliant room, stood for a moment, smiling sardonically—and was himself.

Quietly, still smiling faintly, he wended his way among the tables of noisy courtiers, and sank into his place five chairs down from the empress at the head table.

IV.

The cocktail and soup courses were already past. Hedrock sat, more pensive now that he was not physically on the move, waiting for whatever was next. He studied the men around the table, those young, strong, arrogant, intelligent thirty-year-olds who made up the personal following of her imperial majesty.

He felt a pang, sharp, almost cruel. He had enjoyed his six months among this brilliant gathering. It was a change after the years of the quiet sanity of his Weapon Shop friends. There was something about young people tasting the fruits of stupendous power, a wild, untamed enjoyment of joy that was reminiscent of the old, old days except—

Hedrock smiled wryly. The difference was that coming here had been the most dangerous situation he had committed himself to in all his long years.

He had known, of course, that he would sooner or later involve himself beyond even his secret powers. There was a quality about immortality that he had not allowed for—in the beginning—a developing disregard of risks until the crisis was actually upon him, a pre-danger casualness about the danger. Now as in the past, only his over-all purpose, as distinct from the purposes that people thought he had, was important. He—

The empress' voice, sugar-sweet, rising for the first time above the soft clamor of conversation, cut off his reverie:

"You seem very thoughtful, Captain Hedrock."

Hedrock turned his head slowly to face her. He had been wanting to give her more than the cursory glance he had allowed himself so far; but there were angles to that, such as the fact that her green eyes had been glowing at him from the moment he had seated himself.

It was a strong, a striking, almost a noble countenance. It had the high-cheeked. firm-chinned facial structure of the famous Isher family; and there was no doubt, no doubt at all that here was only the latest, not the last member of a star human line.

Willful passions and power unlimited had twisted that perfect face. But already it was apparent that the erratic, brilliant Innelda, like all the remarkable men and women who were her ancestors, would endure through corruption and intrigue, in spite of character defects—and carry on the extraordinary, the great imperial strain of Isher.

The important thing now, Hedrock thought with a sharpening alertness, was to get her out into the open under the most advantageous—for him—circumstances. He said:

"I was thinking, Innelda, of your grandmother seven times removed, the lovely, glorious Ganeel, the golden-haired empress. Except for your brown hair, you're very like her as she was in her younger days."

The green eyes looked puzzled. The em-

press pursed her lips, and then parted them as if to say something. Before she could speak, Hedrock went on:

"The Weapon Shops of course have an entire pictorial of her life. What I was thinking of was the rather sad idea that some day you, too, would be but a pictorial record in some dusty Information Center."

It struck deep. He had known that this vibrantly alive young woman could not bear the thought of old age or death in connection with herself. Dark anger brought a gleam to her eyes, and produced as always it had in the past what she was really thinking.

"You at least," she snapped in a brittle yet ringing voice, "will never live to see any pictorial of my life. You may be interested to know, my dear captain, that your spy work here has been found out, and you are to be hanged this afternoon."

Astoundingly, the words shocked him to his core. It was all very well to theorize in advance that here was nothing but a cunning, murderous test, a determined attempt to draw him out. But sitting here within speaking distance of a flesh and blood tyrant, this creature whose every whim was law, and who could be as cruel as death itself—sitting here, all theory seemed weak, unreal, fantastic.

Abruptly, it was incredible that he could ever have been so mad as to place himself in such a predicament. He could so easily have waited another generation, or two, or more, for a woman to turn up again in the Isher line. True this was the logical point, both biologically and historically but—

By sheer will power, Hedrock fought off that black mood. He forced himself, then, to relax, to smile finally, grimly.

After all, he had fished that answer out of her, clearly before she really wanted to announce the sentence. In a grisly sort of way, it was a psychological victory. Only—

A few more victories like that; and he'd be all set for a nervous breakdown.

There was still conversation going on in the great salon, but not at the royal table; and it was that that brought Hedrock back to full awareness of his environment. Some of the young men were sitting staring at the empress. Others looked at Hedrock, then at the empress, then back again.

All were transparently puzzled; they seemed uncertain as to whether it was a bad joke or —Hedrock recognized their expression—or one of those damnable real-life dramas that the empress precipitated from time to time, seemingly for the sole purpose of ruining everybody's digestion.

The important thing, Hedrock thought tightly, was that the situation now had the full attention of the men whom he expected to save his life.

It was the empress who broke the silence that lay like a weight over the table; she said softly, tauntingly:

"A penny for your *latest* thoughts, captain."

She couldn't have put it better. Hedrock suppressed a savage smile, and said:

"My earlier statement still holds. You're very like the lovely, temperamental, explosive Ganeel. The main difference is that she never slept with a live snake when she was sixteen."

"What's this?" said a man. "Innelda sleeping with snakes. Is this intended symbolically or literally? Why, look, she's blushing."

It was so. Hedrock's cool gaze studied the empress' scarlet-cheeked confusion with amazed curiosity. He had not for a single second expected to get such a rise out of her.

His eyes narrowed. In a moment, of course, there would be a veritable flood of bad temper. It wouldn't bother most of the bold men present, who had, each in his own way, found that middle path between yes-man and individual that the fiery young woman demanded of all her personal followers.

"Come, come, Hedrock," said the mustachioed Prince del Curtin, "you're not going to keep this splendid little titbit to yourself. I suppose this also is derived from the pictorial files of the Weapon Shops."

Hedrock was silent. His smile of acknowledgment seemed to be directed at the prince-cousin of the empress, but actually he scarcely saw the man. His gaze, his whole attention, was concentrated on the only person in the room who mattered.

The Empress Isher sat, the flush on her face slowly yielding to anger. She climbed to her feet, a dangerous glint in her eyes, but her voice had only a fraction of the fury in it that he had hoped for. She said grimly:

"That was very clever of you, Captain Hedrock, to twist the conversation the way you did. But I assure you it won't do the slightest bit of good. The very fact that you were so swift in your response confirms that you were aware in advance of my intention. You're

a spy, and we're taking no more chances with you."

"Oh, come now, Innelda," said a man. "You're not going to pull a miserable stunt like that."

"You watch out, mister," the woman flared in abrupt violence of temper, "or you'll join him on the scaffold."

The men at the table exchanged significant glances. Some of them shook their heads disapprovingly, and then, all of them fell to talking among themselves, completely ignoring the empress.

Hedrock waited, his muscles like the taut strings of a violin. This was what he had been working for, but now that it was here, it seemed totally inadequate. In the past, ostracism by the men whose companionship she valued had a great emotional effect on the ruler. Twice, since his arrival he had seen it influence her decisively.

But not this time. The realization penetrated to Hedrock with utter finality, as he watched the woman sink back into her chair, and sit there, her long, handsome face twisted satirically. Her smile faded. She said gravely:

"I'm sorry, gentlemen, that you feel as you do. I regret any outburst which would seem to indicate that my decision against Captain Hedrock was a personal one. But I have been greatly upset by my discovery that he is nothing but a spy."

It was impressive; it had a convincing ring to it; and the men's private conversations, which had died while she was speaking, did not resume.

Hedrock leaned back in his chair, his sense of defeat stronger with each passing second. Quite clearly, whatever was behind the execution was too big, too important, for mere cleverness to overbalance.

Drastic, dangerous, deadly action was in order.

For a while, then, he was intent on his own thought. The glittering table with its network of cloth coverings, its gleaming dishes, its two dozen fine-looking young men, yielded before that intensity, became a background to his ever grimmer purpose.

Words, he thought, that would change the whole design of the situation, plus action that would clinch it, and fast.

He grew aware that Prince del Curtin had been speaking for some moments:

"—You can't just make a statement that a man is a spy, and expect us to believe it. We know you're the biggest and best liar this side of creation when it suits you. So how about a little fact."

Hedrock was conscious of impatience. Ac-

tually, the men had already failed, had already accepted the sentence, though they didn't seem to realize it. The quicker they were cut out of the conversation the better.

But careful now, careful. Wait till the empress had committed herself, regardless of how well she did it. She was, he saw, sitting stiffly, her expression grave, unsmiling. She said quietly:

"I'm afraid I shall have to ask you all to trust me. A very serious situation has arisen; it was the sole subject of our council meeting today, and I assure you the decision to execute Captain Hedrock was unanimous, and I am personally distressed by the necessity."

Hedrock said: "I really thought better of your intelligence than this, Innelda. Are you planning another of your futile forays against the Weapon Shops, and you think that I might find out about it, and report it all to the Weapon Shop council?"

Her green eyes blazed at him. Her voice was like chipped steel, as she snapped:

"I shall say nothing that will give you a single clue. I don't know just what kind of a system of communications you have with your superiors, but I know that one exists. My physicists have frequently registered on their instruments powerful wave lengths of extremely high range."

"Originating in my room?" asked Hedrock softly.

She stared at him, her lips drawn into an angry frown. She said reluctantly:

"You would never have dared to come here if you had had to be as obvious as that. I will inform you, sir, that I am not interested in continuing this conversation."

"Though you did not realize it," said Hedrock in his steadiest tone, "I actually said all that was necessary to prove my innocence when I disclosed to you that I knew that, at the age of sixteen, you slept one whole night with a live snake."

"Ah!" said the empress. Her whole body shook with triumph. "Now, we're beginning to get confessions. So you expected to have to put up a defense, and you prepared that little speech."

Hedrock shrugged. "I knew something was being planned for me. My apartment has been searched every day for a week. I've been subjected to the most boring sustained monologues by the prize dunderheads in the army office. Wouldn't I be a simpleton if I hadn't thought of every angle?"

"What I don't get," chimed in a young man, "is the snake business. Why do you think your knowledge of that proves you not guilty? That's too deep for me."

"Don't be such an ass, Maddern," said Prince del Curtin. "It simply means that the Weapon Shops knew intimate details of Innelda's palace life long before Captain Hedrock ever came. It shows the existence of a spy system more dangerous than anything we ever suspected, and the real charge against Captain Hedrock is his absolute remissness in not telling us that such a system existed."

Hedrock was thinking: Not yet, not yet. Somewhere along here the crisis would come with a bang, and then his action must be swift, perfectly timed, decisive. But—not yet.

Aloud, he said coolly: "Why should you worry? Three thousand years have proven that the Weapon Shops have no intention of overthrowing the Imperial government. I know for a fact that the spy ray is used with great discretion, and has never been employed at night except on the occasion that her majesty had the snake sneaked in from the palace zoo. Astounded curiosity made the two women scientists in charge of the machine on that occasion continue their watch.

"The story was, of course, too good to keep in a file; and you may be interested, your majesty, to know that two psychological articles were written about it, one by our greatest living No-man, Edward Gonish."

From the corners of his eyes, Hedrock saw that the slim, lithe body of the woman was leaning forward; her lips were slightly parted; her eyes were wide with an intense interest; her whole being seemed to move according to his words.

"What," she half whispered, "did he say about me?"

With a shock, Hedrock recognized his moment. Now, he thought, *now!*

He was trembling. The realization was the purest pain in his mind. But he couldn't help his physical condition, nor did he care. A man threatened with death was expected to show agitation, or else he was considered unhuman, cold—and received no sympathy.

His voice rose against the thick pattern of babble from distant tables, a little wildly, passionately, but that, too, was good; for a woman was staring at him with wide eyes, a woman who was half child, half genius, and who hungered with all her intense emotional nature

for the strange and the exotic. She sat with shining eyes, as Hedrock said:

"You must be mad, all of you, or you wouldn't make this constant underestimate of the Weapon Shops and their lineally developed science.

"What a petty idea it is to imagine that I have come here as a spy, that I am curious about some simple little governmental secret. I am here for one purpose only, and her majesty is perfectly aware of what it is. If she kills me, she is deliberately destroying her better, greater self; and if I know anything about the Isher line, in the final issue they draw back from suicide."

The empress was straightening, frowning. "The presumption of your purpose," she snapped, "is only equaled by your cleverness."

Hedrock couldn't afford to pay attention to the interruption, couldn't dare to give up his initiative for a single instant. He rushed on:

"To give you some idea of the great scientific attainments of the Weapon Shops, you will be interested to know that they have an instrument which can predict the moment of death of any person.

"Before I came to the palace six months ago, for my own amusement I secured readings as to the death moments of almost every person at this table and of the members of the Imperial Council."

He had them now; he could see it in the strained faces that looked at him with a feverish fascination—but still he could not afford to lose control of the conversation. With an effort, he forced himself to bow at the white-faced ruler; then hastily he said:

"I am happy to announce, your majesty, that you have a long and increasingly honorable life ahead of you. Unfortunately—"

His voice took on a darker tone, as he raced on: "Unfortunately, there is a gentleman present who is destined to die—within minutes."

He did not wait to see the effects of that, but turned in his chair, a tigerishly swift movement—for there was no time to waste; any second, any *instant*, his bluff might be called; and his show end in a ludicrous failure.

His voice bawled across the space that separated him from a table, where sat a dozen men in uniform:

"General Grall!"

"Eh!" The officer who was to carry out the hanging order whipped around. He looked startled when he saw who it was.

It struck Hedrock with a special shock that his bellow had brought complete silence to the room; people at every table had stopped eating, stopped their private conversation, and were watching the royal table and—him.

Abruptly conscious of his greater audience, Hedrock pushed his voice forward in his mouth, tightened his diaphragm, and brought forth the ringing question:

"General Grall, if you were to die this minute, what would be the cause?"

The heavy-faced man two tables away stood up slowly. "I'm in perfect health," he growled. "What the devil are you talking about?"

"Nothing wrong with your heart?" Hedrock urged.

"Not a thing."

Hedrock thrust his chair back, and climbed to his feet. He couldn't afford errors due to awkward positions. With a jerk, he raised his arm and pointed at the general with his finger, rudely.

"You're General Lister Grall, are you not?"

"That's right. And now, Captain Hedrock, I resent most violently this—"

Hedrock cut him off: "General, I regret to announce that, according to the records of the Weapon Shops, you are due to die at exactly one fifteen o'clock *today* from heart failure. That's this minute, this—second."

There was no stopping now. With a single, synchronized motion, Hedrock bent his finger, shaped his hand to receive the gun materialized on an invisible plane by the gun ring on his finger.

No ordinary, retail-type gun was that unseen, wizard's product, but a special Unlimited never sold across the counters, never displayed, never used except in extreme crises.

It fired instantly on a vibration plane beyond human vision; and, as the general's heart muscles were caught by the paralyzing force, Hedrock unclenched his hand; the invisible gun dematerialized.

In the pandemonium that followed, Hedrock walked to the throne chair at the head of the royal table, and bent over the empress. He could not suppress a tingle of admiration for she was completely, abnormally calm.

Emotional, erotic woman she might be, but in actual moments of excitement, during the hour of vital decision, all the great, basic stability that was her Isher inheritance came to the fore.

It was that quality of utter sanity in her that

he had appealed to; and here it was, like a precious jewel, shining at him from the quiet viridescence of her eyes. She said finally:

"I suppose you realize you have, by implication, confessed everything by your killing of General Grall."

He knew better than to deny anything to the supernal being she had for that sustained moment become. He said:

"I was advised of the sentence of death, and by whom it was to be carried out."

"Then you admit it?"

"I'll admit anything that you wish so long as you understand that I have your best interests at heart."

She looked incredulous. "A Weapon Shop man, whose organization fights me at every turn, talking about my interests."

"I am not, never have been, never will be, a Weapon Shop man." Hedrock spoke deliberately.

A startled look came into her face; then: "I almost believe that. There's something strange, and alien, about you, something I must discover—"

"Some day, I'll tell you. I promise."

"You seem very sure that I shall not have somebody else hang you."

"As I said before, the Ishers do not commit suicide."

"Now you're on your old theme, your impossible ambition. But never mind that. I'm going to let you live, but for the time being you must leave the palace. You can't fool me with that talk about an all-purpose spy ray."

"Can't I?"

"You may have had such a machine prying into the palace when I was sixteen, but since then the whole palace has been fitted with defense screens. Those can be pierced only by a two-way communication machine. In other words, there must be a machine inside as well as out."

"You're very clever."

"As for the pretense," the woman went on, "that the Weapon Shops can see into the future, let me inform you that we know as much about time travel, and its impossible limitations, as the Weapon Shops. The see-saw principle involved is only too clearly recognized, with all its ever-fatal end results. But, again, never mind that.

"I want you to leave for two months. I may call you back before then, but it all depends on my little enterprise. Meantime, you may transmit this message to the Weapon Shop council. What I am doing is not in the faintest degree harmful to the Weapon Shops. I swear that on my honor."

For a long moment, Hedrock gazed at her steadily. He said at last, softly:

"I am going to make a very profound statement: I haven't the faintest idea what you are doing, or going to do, but in your adult life I have noticed one thing: In all your major political and economic moves, you are actuated by conservative impulses.

"Don't do it. Change is coming; let it come. Don't fight it, but lead it, direct it. Add new laurels of prestige to the famous name of Isher."

"Thank you for your advice," she said coldly.

Hedrock bowed, said: "I'll be knocking at your door in two months. Good-by."

The hum of renewed conversation was thickening behind him as he reached the series of ornate doors on the far side of the room. He passed through; and then, out of sight, quickened his pace.

He reached the elevators safely, stepped into one hurriedly, and pressed the express button for the roof. It was a long trip; and his nerves grew jumpy.

Any minute, any *second*, that mood of the empress would wear off and—

The elevator stopped; the door opened. He was stepping out before he noticed the body of men. They came forward at the double march, and instantly hemmed him in. They were in plain clothes, but there was no mistaking that here were—police.

The next instant one of the men said:

"Captain Hedrock, you are under arrest."

V.

For Neelan, facing a gun that withdrew sideways as he advanced, there was a kaleidoscope of swift impressions. He saw that he was in the control room of the spaceship; and the reality of that held him for a moment, startled.

A control room was, by law, located in the center of a ship. That meant this hangar extended about four hundred feet underground, as well as above.

An eight-hundred-foot spaceship—what an enormous machine for a private citizen to own. Somebody had planned—big.

Neelan drew a deep breath. Gil, he thought shakily, Gil, you tight-mouthed idiot, why

didn't you write and tell me? Now, I've got to find out from—

"Well," the stranger's voice cut raspingly across his thought, "what do you think of it?"

Slowly, Neelan turned toward his captor. He saw a long, pale-faced individual, about thirty-five years old. The fellow had maneuvered the mobile unit toward the ceiling; and he was in the act of slipping Neelan's gun into his coat pocket. In his fingers he held an Imperial single-noded pistol; and he was regarding Neelan with large, brown, suspicious eyes.

Neelan said swiftly: "For Isher's sake, put that gun away. I can see now there's something damn funny going on. But I still need the job. Does that make sense?"

He had struck, he realized, the right note. The man relaxed visibly. His gun lowered. He spoke finally with an attempt at heartiness, that didn't quite come off:

"Now you're talking. You can see how it was. I thought you weren't going to come in."

Neelan said: "The spaceship startled me, located here in the heart of the city."

It was a point, it seemed to him, that he should press even harder: the fact that all this was new and strange to Gil's brother needed stressing to a man who knew their relationship, who *knew* that Gil was dead, and yet who wasn't saying a word about his knowledge.

Neelan went on: "So long as we understand each other, I guess we'll get along. The hundred credits a week still goes, does it?"

The man nodded. "And it'll be clear, too," he said, "because I'm taking no chances on you not coming back here."

Neelan stared. "What do you mean?"

The fellow smiled sardonically. He seemed to be more pleased with the situation. He looked surer of himself; his voice sounded cool and confident, as he said:

"You're going to live aboard until the job is done."

"Oh!"

He was startled, in spite of himself. Not that having to remain bothered him, although he ought to make some kind of strong protest as a matter of principle. The main thing was—

According to the Weapon Shops, a great and honest scientist, named Derd Kershaw, owned this building. If honesty could be judged by actions, then this long-bodied unpleasant young man was *not* Kershaw.

Was it possible that an accident had occurred that had killed Kershaw and Gil and the rest of the staff, leaving one survivor, who was trying to take personal advantage of the situation?

Or was the reality even more sinister than that? Whatever it was, he had to say something, a protest, something explicit. Neelan said:

"Now, look here, I don't really mind staying aboard, but you're taking a pretty high-handed manner. What's up? It's all very well for me to keep saying it's none of my business. But every few seconds you push something new at me until—well, I think I have a right to a few general facts."

"Like hell you have!" the man snapped.

Neelan persisted: "What's your name? I don't think it will hurt you if I know who you are."

"Come along!" It was a curt command. "I'll show you the engine room."

He motioned with his gun, then paused. His long face twisted into a frown. "I guess I can tell you my name." He smiled with sudden savage exultation. "After all, *she* knows it. My name is Rel Greer."

It meant nothing except—he wasn't Kershaw. And admitted it. But who the devil was *she?* Neelan said:

"You're a scientist?"

The man flushed. The color crowded into his cheeks in a flood of anger, and then, almost instantly, he turned even whiter than he had been. He snapped:

"The best scientist on this side of—" Greer stopped the words with a visible effort. He swallowed hard, and then he glared at Neelan, and raged: "What are you trying to do—pump me? Now, let's go. Any further talk can wait till lunch time."

Neelan hesitated. The fellow's unexpected anger astounded him; and yet—

Questions quivered on his lips. He felt himself on the verge of vital information. It required a distinct effort to remember his dangerous position.

Quietly, he turned, and led the way down into the bowels of the ship.

They came to a world of engines. Titanic drivers of the approved point-expand-point design, glistening oval-shaped monsters that filled all one great room, clustering almost

belly to sleek belly over the floor.

Neelan counted them from the bottom of the stairs with a gathering surprise: one, two . . . seventeen—

"But," he said, amazed, "these are one-hundred-million-cycle engines. Since when has a ship under a thousand-feet length needed more than two such supers, and one of them for emergency only—let alone seventeen?"

He saw that Greer was enjoying his astonishment. The man stood with a faint sneer of superiority on his pasty-white face.

"This ship is a new invention," he said smugly. "I'm selling it. I'm negotiating, and have been for some weeks, with the empress herself."

He looked hard at Neelan. "I decided on the way down to tell you that. It isn't any of your business, but I don't want you worrying your head off about it, and maybe prowling around.

"Now you know where you stand. It's *her* idea that the whole thing be kept quiet. And I pity any interloper who goes counter to her wishes in—anything. The Earth wouldn't be big enough to hold such a fool unless he was a Weapon Shop man. There, is everything clear?"

Neelan mustered a nod. He couldn't have spoken to save his life. He felt so sick that it was like a physical pain. For—just like that—the reality of what had happened came clear.

The great scientist, Kershaw, had hired Gil and Greer and perhaps others to assist him in perfecting his invention. Somewhere along the line, Greer had murdered everyone else, and taken control of the ship.

There were blurs in that logic structure, details missing—for instance, why had a whole year elapsed before Greer acted—but the main sequence of events was only too obvious.

Gil had died so that this creature might feel himself safe to dispose of an invention important enough to interest the Empress Isher.

"What I want," Greer's voice penetrated to him, "is for you to lift one engine at a time into the repair shop on the floor above, and fix it before you even touch another. None of this mass production stuff of doing the same plate on each engine one after the other, and so on—"

Greer stopped short. His eyes were brown pools of suspicion. "What's the matter? You gave me a funny look there."

Neelan managed to say: "I was thinking that you certainly are taking precautions."

Greer relaxed, and looked pleased. "Oh, I'm taking no chances. I want to be able to leave here at a moment's notice, if anybody tries to double-cross me."

Neelan scarcely heard. His mind was thrumming like a machine. The man had revealed himself so irrevocably now that there was no longer any doubt.

The silly, stupid, egotistical fool. Standing there and talking knowingly about not doing more than one engine at a time.

The insides of different atomic motors, once they had been in operation, were simply not allowed together. No two engines ever stopped at the same "boiling" point. Exposed to each other, a leveling flow would start, that would ruin the plates, and probably everything else in the vicinity.

And if plates from seventeen motors ever started interflowing—

Neelan couldn't even let himself picture it. The catastrophe would be on such a vast scale that part of the ship would dissolve into its component elements, and the rest would droop into shapeless blobs.

No wonder Greer had reacted so violently to the question as to whether or not he was a scientist. Whatever else he was, he wasn't even a mechanic when it came to atomic energy—and therefore the one question about his status must have seemed to him potent with hidden meanings.

Very, very definitely, Neelan thought grimly, he was going to carry out that part of Greer's orders forbidding mass repairing. As for the rest—his mind paused icily—it shouldn't be hard for a man like himself to best an ignoramus like Greer. It—

Greer was speaking again: "I've fixed up a place for myself in the empty room above the repair shop. I'll spend most of my time there during the next couple of months. It isn't that I don't trust you, but while I'm there, I'll *know* that you're not wandering around the ship, prying into secrets."

Neelan was able to say: "I'll get busy right away."

He was trembling, as he climbed up to the repair room. It seemed hardly credible that it could have happened so soon but—his opportunity was upon him.

He had his purpose. The only thing was, Greer didn't go up to the next level right away. He hung around like a man starved for com-

pany, but at the same time afraid of it.

At any other time, with anyone else, Neelan would have felt at least a bleak sympathy. Of all the emotions he could appreciate, it was loneliness.

Not now! A blaze of impatience racked him. Damn you, he thought, get out of here. Get up to your guard room.

It struck him suddenly what he must do. "I'll bore him stiff," he thought savagely.

He began to examine the tools, conscious of Greer's eyes on him. There were mobile cranes and clamping machines, and welders and de-welders, and serrated polishers, all on the necessary gigantic scale, and all—one glance at meters plus a surge of testing power sufficed to verify the fact—ready for action.

But how would a nonscientist like Greer know that? The important thing was, it seemed to Neelan, that he gain control of the ship before he took an engine apart. Otherwise he'd be tied down for at least four days.

An atomic motor simply wasn't left standing in pieces. Far better, therefore, to spend several hours seeming to check over the repair tools.

A half-hour passed. From somewhere behind Neelan, Greer said:

"So you've spent a great deal of your life on other planets. What brought you back?"

There could be no hesitating over that. The man knew too much. "My brother's death!" Neelan said.

"Oh. Your brother died?"

"Yes." Lay it on thick, Neelan thought. "Yes, he used to send me an allowance. When that stopped, I made inquiries, and it seems he's been missing for a year, unregistered. It'll take about six months more to close the estate, but, as you know, the courts recognize nonregistration as proof of death in these days of multiple assassinations."

"I know," was all Greer said.

In the silence that followed, Neelan thought grimly: "Let him mull that over. It wouldn't do any harm, in case something went wrong, for Greer to believe that Gil and he had no strong feelings for each other. In fact, press the point."

"It's more than ten years," Neelan said, "since I saw him. I found I didn't have the faintest sense of kinship. I didn't give a damn whether he was dead or alive. Funny."

Greer said: "You're going back into space?"

Neelan shrugged. Abruptly, it was irritating again to have to talk to the man. But there was no evading a direct question. "Nope! Earth for me from now on. There's more excitement, fun, pleasure."

"I wouldn't," said Greer, after a silence, "exchange my last year in space for all the pleasure in Imperial City."

"Each to his own taste—" Neelan began.

And stopped. A thrill burned along his nerves, and flared into his brain. His will—to get the man up to the insulation room—collapsed into secondary importance.

For here was information.

Slowly, the mental repercussions of the words died. Puzzlement came. Actually, he hadn't learned much. What Greer had done during the last year wouldn't explain much. Gil had been dead during the whole time.

The picture remained as blurred as ever, except for one thing: Greer had volunteered the new fact. He wanted to talk. He could be led into saying more.

Neelan said: "My idea of life isn't cruising around space looking for more meteorites. I've done it, and I know."

"Meteorites!" Greer exploded. "Are you crazy? Do you think the Empress Isher would be interested in meteorites? This is a hundred-billion-credit deal? Do you hear that? And she's going to pay it too."

He began to pace the floor, a rising excitement in his manner. He whirled suddenly on Neelan.

"Do you know where I've been?" he demanded. "I—"

He stopped. The muscles of his face worked convulsively. Finally, he managed a grim smile. "Oh, no, you don't," he said. "You're not pulling anything out of me. Not that it really matters but—"

He stood there, staring at Neelan. Abruptly, he twisted on his heel, climbed the stairway, and disappeared from view.

Neelan gazed at the stairway, his mind almost blank, but conscious of one thing: The time had come for action.

Neelan examined the ceiling metal with a modified transparency, and nodded finally in satisfaction. Four inches thick, the usual alloy of lead and "heavy" beryllium, atomically processed.

The transparency also showed the exact spot where Greer was sitting, a blurred figure, reading a book. Or rather, holding a book. It was impossible to see whether he was reading.

Neelan felt himself cold, humorless. His only emotion was a remote, deadly pleasure that Greer was sitting up there, smugly imagining himself in control of the situation. To think that the man had brought an easy-chair into an empty room without even considering why the room was empty.

The insulation "gap," confining areas where power was developed or used in large amounts was old both in law and of necessity. The legal restrictions had been so effective that most people were probably not even aware that the danger or the protection existed. And yet at the same time scientists like Gil or Kershaw would be so familiar with the idea of the restrictions that it probably had never occurred to them that others might not know.

Which, Neelan thought, was ideal.

He maneuvered the heavy polisher directly under the spot where Greer was sitting, and turned its finely toothed surface to point upward. Then he began his estimation.

Greer had looked about one hundred seventy pounds. Two thirds of that, roughly, was one hundred fourteen. To be on the safe side, allow for a blow that would kill a man of a hundred pounds. Greer didn't look too physically fit. He'd need the handicap.

There was, of course, the four-inch floor to figure in. Fortunately, its resistance was a formula based on tension.

To Neelan, it was briefly interesting to remember the day in the university when the lab professor had illustrated with a tiny machine the physical impact that resulted from exposure to the active surface of power-driven tools.

The model lab machine had delivered a blow as of a gently thrust fist. This polisher would—

Greer simply crumpled.

Neelan went upstairs to where the man lay sprawled on a leg-rest chair. He examined the unconscious body with a color transparency, for detail.

No bones broken. And the heart still beat. Good. A dead man wouldn't be able to answer questions.

There were a lot of questions.

It required considerable mathematical work to plot a system of force lines that would bind Greer into a reasonably comfortable position, allowing his arms and legs to move, and his body to turn, and yet capable of holding him forever if necessary.

Neelan spent the following hour going over the big ship. It was a cursory search only—there were too many locked doors and packed storerooms—and it failed to produce what he was looking for: a Lambeth mind-control machine.

Logic said there was none aboard. The very fact that Greer had got on the staff proved that those fuzzy-minded scientists, Kershaw and Gil, had not had the sense to test everyone on ship for validity.

Neelan experienced a surge of helpless anger. What in the world could ever be done with the type of mind that would spend years exhaustively exploring the variable reactions of energy and which would then quite blithely admit a human snake to a murder opportunity—and so destroy everything?

His rage faded before the reality of the long year that had passed. He went down to the insulation room—and found Greer conscious.

The man glared at him with mingled hate and fear. His voice made a crescendo of sounds, of threats, of warnings about what the empress would do to him. When the babble finally died down, Neelan said:

"Where are the others? Where are Kershaw and my brother?"

The brown eyes widened, then narrowed to pin points: "Go to hell!" said Greer. But he sounded frightened.

Neelan said: "What's the combination at this end of that telestat in Room 1874, Trellis Minor Building?"

No answer.

There was a sensory-energy test, Neelan recalled, that showed under what degree of torture a man would talk. It took half an hour to rig up a testing instrument.

Greer screamed hideously—and Neelan, shuddering, had his answer: Greer would talk all right, but it just happened that there was no one around robust enough to carry the torture through.

Neelan used the minutes and the hours of the afternoon to go over the ship, room by room. No cursory search, this time. He used an atomic drill to break recalcitrant locks. The personal quarters above the control room held him longest. But Greer had been there before him.

Nothing remained. Greer had used his time well. If Gil or Kershaw had ever been aboard, there were no identifying markers to show it, no letters, no personal property, nothing that would ever cause embarrassment to a murderer.

In the air lock at the very nose of the ship was a fully equipped lifeboat, powered by two replicas of the giant engines in the main machine. The lifeboat was about a hundred feet long.

Nowhere was there a Lambeth mind controller.

He had to have one, if he was ever going to get any information from Greer.

In a strong box in the control room, he found a hundred thousand credits. A Lambeth would cost about five hundred so—

He stuffed a thousand credits into his pocketbook, then spent nearly a quarter of an hour experimenting with the door controls. Finally he set up a time sequence that would open the doors for ninety seconds at nine a. m. every day till the power was shut off.

He fed Greer; the man ate sullenly, said at last:

"You're going out, I see. You could at least make it possible for me to free myself if anything should happen to you."

Neelan said nothing. But under Greer's anxious eyes, he put a timer on the force-line machine, and set it for seventy-two hours. Then he loaded the man, force lines and all,

onto an antigravity plate, and carted him upstairs to one of the bedrooms above the control room. His watch said a quarter to seven, as he emerged into the street.

His mind was intent on the evening ahead, when he reached Mrs. Dendley's. He went straight up to his room. Funny how weary he was, as if his brain had been lashed to exhaustion. It had been a long day, and it wasn't over yet. A little nap, and then—

His doorbell tinkled. It was the prim little maid. "Madam says she noticed you didn't look at the letter box, and that a letter came for you this afternoon by special delivery. It's from Mars."

As he closed the door, Neelan saw that his hand holding the letter was trembling. He stood like that for an instant staring down at the unfamiliar handwriting and at the red sign of Mars in the upper right-hand corner and—

Shaking, he went to the bed and lay down. It was restful lying there, and, slowly, his heart eased from its violent pumping; a measure of strength crept back into his muscles.

The first coherent thought came: It couldn't be a normal answer to the letter he had written twenty days before to his Martian post-office address, asking them to forward any mail that had arrived for him during the past year.

The mail liners from Earth to Mars took from eighteen to sixty days for the trip, depending on changing planetary position. On the day he had written, the trip was scheduled to take twenty-four days. Twenty-four days there, twenty-four back.

That wasn't the answer. And, besides, if Gil had written him before he died, this wasn't the letter. It wasn't his handwriting. *Besides*, no one on Mars knew his address. He was registered here at Mrs. Dendley's of course, but who would—

His curious weakness passed. He sat up, tore the letter open and emptied the contents onto the quilt. There were two items inside: Another letter and a note. The note was from the Weapon Shops, and it read:

DEAR MR. NEELAN:

After your call this morning, I recollected our first conversation in which you described the various actions you had taken to trace your brother. Among other things, I remembered that you stated you had written to Mars for any mail that might have accumulated there for you.

As you probably know, the Weapon Shops have a vibratory transmission system that is practically instantaneous over planetary distances. I utilized this to procure for you the inclosed letter. Please destroy this note.

The note was unsigned. Neelan held it over the atomic-powered hearth, and watched it frizzle away. Then, and not till then, he picked up the letter that had been with the note. He was thinking grayly: He'd waited a whole year, so there was no rush.

The letter was from Gil; and it read:

DEAR DAN:

Now I can tell you about the greatest invention in the history of the human race.

I had to wait till now, a few hours before we leave, because we could not take the risk of the letter being in any way intercepted. We want to present the world with a *fait accompli*. When we come back we intend to shout our news from the housetops, and have endless film and other records to support our story. But to get down to fact:

There are seven of us, headed by the famous scientist, Derd Kershaw. Six of us are science specialists; the seventh is a fellow called Greer, a sort of general handy man who keeps the books and the records, who turns on the automatic cookers, and so on. Kershaw is teaching him how to operate the controls, so that the rest of us can be relieved of that chore—

Neelan paused there, sick to his soul. "The children!" he muttered huskily, "those damn grown-up children."

After a moment, he thought: So Greer was a handy man! No wonder the man had known nothing basic about science, the lecherous, egotistical—

He read on, but there was an odd blur over his vision that made the words hard to see:

The way I got into the affair is that Kershaw noticed an article of mine in the *Atomic Journal*, in which I described that I had been doing some contraterrene research exactly along the lines of an idea that he had for the development of his invention.

Right here I might as well say that the chance of this invention being rediscovered is practically nil. It embraces, in its conception, too many specialized fields. You know what we were taught during our training period, that there are nearly five hundred thousand special science fields, and that undoubtedly by skillful coordination of knowledges, countless new inventions would be forthcoming, but that no known mind training could ever co-ordinate a fraction of these sciences, let alone all of them.

I mention this to emphasize once again the importance of secrecy. Kershaw and I had a midnight conference, and I was hired under the most confidential terms.

Dan, listen—the news is absolutely stupendous. We've got a drive that's so fast it's like a dream. The stars are conquered. Almost as soon as I finish this letter, we leave for Centaurus.

I feel sick and shaky and cold and hot at the mere idea of it. It means everything. It's going to blow

the world wide open. Just think of all those people who were forcibly dumped on Mars and Venus and the various moons—it had to be done, of course; somebody had to live there and exploit their wealth—but now there's hope, a new chance on greener, finer worlds.

The worlds will be there, all right; Choicer's Law of Planets proved that. From this point onward, man will expand without limit, and put an end forever to all those petty murderous squabbles over territory and ownership of property. Henceforth there will always be more than enough.

The reason we have to be so careful is that the Isher Empire cannot hope to survive the unprecedented emigration that would set in, and the Empress Innelda will be the first to realize, the first to attempt our utter destruction.

One more thing: Kershaw and I have discussed the possible effect of light years of distance on yours and my sensory relation. He thinks that our speed of withdrawal from the solar system will give the effect of an abrupt break, and of course, there will be the agony of acceleration. We—

Neelan stopped there, his mind rotating like a power-driven wheel, faster, faster. Why, that was what he had felt: the agony, then the break—

Gil wasn't dead.

Or rather—Neelan felt as if his head was coming off from the sheer violence of his thought—Gil hadn't died that day a year ago. Somewhere during the journey, Greer had—

Neelan's thought contorted. Deadly memory came of the dream he had had, of Gil in a desert on a nightmare world, racked by incredible storms.

The sensory connection still existed. Tenuous, imperceptible during waking hours, it had manifested itself to that supersensitive structure that is the human body during sleep hours. And at a time when, for the first time in more than a year, he had relaxed his tired nerves.

He tried to remember just how he had felt the previous night, the sense of being finished with the whole business, the swift way he had fallen into deep, restful sleep; and then, the dream—

And it had happened *last night.*

Gil was alive.

Now he must get back to the ship, force that monstrous villain, Greer, to disgorge the truth about where he had marooned the first men to fly to the stars and—

With a terrible effort, Neelan caught his twisting brain, and held it hard in one spot. No use getting excited. He couldn't possibly get back into the ship till morning; so carry on as planned.

Visit the Weapon Shop, and tell the man what had happened. Buy a Lambeth, call up Professor Rayburn, perhaps take in a show to quiet the jumpiest case of nerves he'd ever had; and then, in the morning, start off for far Centaurus.

Neelan found himself repeating the fabulous name out loud, as if it was a melody, a pure music sound. It was a long moment before he remembered that he hadn't finished the letter. There was only a paragraph:

. . . We will probably be separated for the first time since we were born. It's going to feel very empty and lonely.

I know you're envying me, Dan, as you read this. When I think of all the thousands of years that man has dreamed of the stars, of how it has been proven time and again that it can't be done, I know exactly how you feel. Particularly you who were the adventurer of our family.

Wish me luck, Dan, and watch your tongue.

Your other half,
GIL.

It was the final warning that brought the real spurt of uneasiness. Abruptly, he didn't like his position. His best bet, Neelan thought, was to get away from this house where he was registered. If the empress was keeping any watch on Greer's spaceship, the presence of a stranger aboard would certainly have been reported.

It might even be advisable to try to get hold of an invisibility belt, and so sneak aboard the ship when the doors opened in the morning. But first, memorize the letter, then burn it. Take no chances anywhere.

Outside, the air was fresh and cool. Night was nearer, he saw. More lights were coming on. The city was putting on its costume jewelry; and the result was a developing glitter that titillated his eyes.

Neelan walked along alertly, his hand near his gun. All weariness seemed gone from him. Wonderful what a good mental bracer could do to tone up the body.

He had a purpose, hope; he would do his damnedest.

He saw the carplane swoop down to the curb beside him, but that was normal enough. It was a regular stop; and four men were waiting for it besides himself.

The door of the machine opened; and at that penultimate second, Neelan snatched his gun. Marvelous instrument that it was, it leaped from its holster to meet his reaching fingers. But even that was too late.

The four men had him—wrists, legs, body.

They bundled him into the darkened interior. The next instant the machine was hurtling upward.

VI.

Around Neelan was darkness. Acceleration pressed him hard against his seat. Skillfully interlaced force lines held him there firmly. Of the men who had jammed him into the artificially blackened interior, there was not sound nor sign. He had time to feel thoroughly ill.

He was caught, completely. The empress' forces must have been watching the hangar and its super-ship day and night; and now, the universe was lost.

As swiftly as it had accelerated, the carplane began to slow. It was still decelerating as it landed; and then, its interior still in darkness, taxied at great speed down what seemed a long, curving incline.

It stopped finally with a lurch; and for the first time there was movement, low voices, a drift of meaningful and meaningless sound:

"—search him . . . then . . . at once. . . . She's waiting—"

In the artificial night, fingers fumbled over Neelan; he felt his gun, that had automatically returned to its holster, jerked away. The pocket in which were the thousand credits lightened. Hands grabbed him at last.

"This way."

It was brighter outside, but only by comparison. Glowing wisps clung to the roof of the corridors along which he was led, point sources of light that held their tiny radiance in tight loops, as if fearing to shed it afar.

A door opened; and a glare tortured Neelan's eyes. When he could see again, he saw that he was in a large, tastefully furnished room; and that a woman sat on a settee before a tea table.

She was pouring tea from a platinum teapot, and she said in a softly rich voice:

"Do you take cream, milk or lemon, Mr. Neelan?"

She had green eyes, this woman, and a distinctively long face. Unmistakable, famous face. The sight of her shocked Neelan to his bones. Government, yes—he had expected that, but not her, *personally*.

It was the echo of her quiet words that braced him, eased his tensing nerves, made it possible for him to meet the moment with only that one instant of falter.

Neelan bowed slightly. "Milk," he said, "your majesty."

He came forward warily, and saw that the empress was gazing up at him slant-eyed. Neelan thought tremblingly: Thank God, he knew the truth, oh thank God.

Otherwise, this cozy little trap might have caught him. It wouldn't have taken much, without Gil's letter, to make him give up the whole miserable business.

The woman was inclining her head. "Sit, please," she said.

Neelan sank into the chair indicated, and took his cup of tea, and waited.

And waited.

The empress sat sipping her drink—she had, he noticed, taken lemon in hers—and staring into space. After a while, Neelan began to admire her patience. Inwardly, she must be straining. What was it Gil had said:

"The Isher Empire cannot survive the unlimited emigration that would set in, and the empress will be the first to realize, the first to attempt our utter destruction—"

Get back to the ship, Neelan thought, get back safe. Nothing else mattered. For somewhere out there in immensity were Gil and Kershaw, and only he of all the human race could save them.

Only he, who had invented nothing, could help mankind to attain the remote stars and ultimate destiny.

Abruptly, the silence racked his nerves, the tremendousness of the stakes hurt his brain. He shifted uneasily in his chair and—

The empress spoke gently: "Mr. Neelan, you occupy a unique position in the world of great affairs. Your government, your—empress—require your loyal and faithful services."

Neelan tried to look puzzled. "I shall be only too happy," he said, "to do anything that is required of me. I am a loyal subject of your majesty. But I think a mistake must have been made. What unique position do I occupy?"

She was looking at him from under half-closed lashes; and the intensity of her gaze gave Neelan a tingling start. Her eyes positively glowed, as she said, more sharply:

"What were you doing aboard the spaceship of Rel Greer?"

Neelan felt no great satisfaction in the brief surprise he mustered for the question. But he explained in an even tone about the ad, his need for a job. The woman listened without interruption till he had finished, then she said

to somebody behind him:

"Zeydel, was there such an ad?"

"I am, your majesty," said a man's harsh voice, "already trying to get the Public Ad Service."

Neelan turned slowly. There was an alcove, hidden by a long screen, behind which sat several men. He couldn't be sure whether there were four or five.

The voice of Zeydel was hammering into a telestat. There was a pause, a *click*, and then: "Yes, your majesty, there is such an ad."

"*Is?*"

It was the woman; and Neelan felt impelled to answer the implication in that single-worded question:

"If you mean by that, your majesty, that the position is still open, I assure you it is not. I am definitely hired; and he was so anxious that, although tomorrow is Rest Day, I agreed to return at nine in the morning."

There was silence; and Neelan had time to realize that the tea party was over. And the way they had pounced on an infinitesimal variation showed what he was in for.

It was going to be a long night.

Silence settled again, like a weight. The woman sat with a vague smile on her face, her eyes veiling her thoughts. The teacup in her fingers remained unnaturally motionless in one position, as the minutes dragged. At last, she set the cup down; and it was as if a rehearsed drama had received its cue.

In the background, the voice of Zeydel began to intone:

"The information is now coming through, your majesty. His name is Daniel Neelan, one of twins, born 4758 Isher, thirty-three years ago, to Edee Neelan. Their father died before they were born; and accordingly, their mother, unable to guarantee support, put them under contract to the Eugenics Institute—"

Neelan listened intently, as the word picture unfolded. It was all there, in essence: His leaving Earth, his gambling career, the fact that he had killed several men in self-defense, the discovery by himself and Carew of the "heavy" beryllium meteorite; and finally his return to Earth to look for his brother. When Zeydel's voice finally died away, the empress said softly:

"I see that you are one of us, Mr. Neelan, one of the lucky born. A man who knows how to live, and how to die."

In spite of himself, in spite of the greatness of the issues, Neelan began to feel fascinated. The Imperial Innelda was different, different from anything he had ever pictured. Not cold and stiff and regal, but warm and human and—

"I have," she continued, "divided human beings into two general categories: Those who spend their lives obsessed by fear, and those who do not. I cannot honestly feel too sorry for the former no matter what happens. Only the latter count in the scheme of things."

The strange thing about her words was that he seemed raised by them, and compelled henceforth to live in the upper of the two realms she had described. Neelan found his voice:

"I would say the classification is a little severe, particularly because bravery is a matter of early training."

The green eyes were steady on him, as he spoke, enigmatic. Neelan had a sense of gazing into fathomless depths, and he thought: Careful, careful.

The woman said in her luscious voice:

"I want to talk to you. I want to convince you. What I desire from you is too important for there to be the slightest doubt about your actions."

"Your majesty," Neelan protested, "if you would tell me—"

She cut him off, imperiously: "I must make myself clear; you must understand. This morning, Dan Neelan, when I was informed that a strange young man . . . that is, you . . . had entered the Greer spaceship, I immediately ordered the execution of a Captain Hedrock, a Weapon Shop spy, whom I had previously tolerated in the palace."

Her voice, so abruptly ablaze, burned on: "I tell you this to illustrate graphically the completeness and extent of the precautions I am prepared to take to insure that my will shall prevail. Consider his fate as symbolical of what will befall anyone who dares to oppose me in this matter, or who bungles his part of the job.

"Here is what you must and will do: Tonight, before you leave this room, you will be fitted with an invisibility belt, a miniature telestat, and a revolver that shoots bullets.

"The reason for such a gun is that Greer probably carries a Weapon Shop energy gun, which has the power of protecting its wearer from any small-powered atomic revolver.

"The reason for the telestat is that we will

then know exactly what you are doing or saying every second of the time between now and the accomplishment of your task.

"As a further means of educing your honesty, the telestat will have in it an energy charge which, by remote control, will blow you to bits if you start talking or writing out of turn.

"The telestat will also apprise us of the exact instant that you complete your work. Before you can have an opportunity of, for instance, running off with the spaceship, great mobile energy guns will be tearing enormous gaps in the walls of the hangar and the ship; and within minutes my men will be swarming inside.

"Your task is simple, straightforward: At an opportune moment during the day, you will render yourself invisible and, thus protected, approach Greer and put a bullet through his head. If you fail, or in any way deceive us, you die. And now—"

Her tensed body relaxed; the flame died from her gaze. There was suddenly a warm and generous smile in her eyes, and around her lips. She said in her earlier, quieter voice:

"I hope, Dan Neelan, that I have made myself clear."

There was no doubt of that. The tigress had unsheathed her claws; and they were made of steel and quiescent violence.

The soul of this woman must be pure fire.

Neelan sat very still, forcing himself to picture what she had said—going to the spaceship—

His thought kept coming back to that in little flashes of mental intensity. All was not lost. They intended to let him return to the ship, under terrible restrictions to be sure. but—return! With Greer impotent and enchained, something must be possible, some way out, however dangerous or involved.

The worst part was that energy bomb. It—

The men were coming out of the alcove, out of the dimness into the light; and there were five, not four. Not that the number mattered. A billion more out there in the great world would eagerly take their place.

But these looked mature, capable. All were easily in their late thirties, the oldest, Zeydel, possibly as much as forty-five.

Zeydel had slate-colored eyes, a thin beak of a nose, and lips that formed a long slit across his face. He bowed to the woman, a faint, grim smile on his raffish countenance.

"Your majesty!"

"Speak."

"It will be necessary to undress Mr. Neelan partially in order to fit the invisibility belt."

The empress' eyes smiled at Neelan sardonically: "I am sure Mr. Neelan realizes that I am the mother of nineteen billion people. I have reached the age," she finished coolly, "when only bad manners shock me. I must see that everything is done right. Proceed."

Zeydel said: "Your upper clothes only. The invisibility belt fits directly over the waist. We won't feed it power until you're inside the spaceship; all you have to do then is pull this switch—"

Neelan watched the flat, flexible, flesh-colored thing being strapped around his waist. It was quite heavy; and it felt unpleasant. He could not shake off the unwholesome impression that he was being fitted with his death raiment.

"And here," said Zeydel from that sword-edge-shaped mouth of his, "is the telestat."

Neelan's mind did a twisting somersault, as he stared at the thing.

A necktie! By all the gods, a necktie! A little thicker than it should be, a little stiff for cloth, but the color pattern, the general appearance, was quiet perfection.

It hung around his neck, lighter than he had expected after the weight of the invisibility belt. But it made him feel hot, then cold, then hot again, as spasmic memory burst on him that in it was the energy charge.

He pictured the explosion tearing his head off— And then a fountain pen was being shoved into his vest pocket, and the gritty voice of Zeydel was explaining:

"That's the gun. Simply point it, and press on the clip. It has two bullets in it; and now—"

The slate eyes surveyed Neelan with icy detachment. The man's voice had a flat quality, as he continued:

"You have heard our glorious ruler's commands. You must consider yourself a soldier who has been called to duty against a man for whom there can be no sympathy.

"This scoundrel, Greer, has deliberately set himself against the Crown. He has an invention which endangers the State, and which must be completely withheld from the knowledge of the public. Greer presumes to regard himself as a negotiator of equal rank with the government; and, from a position of temporary immunity, to argue arrogantly, demand

impossible terms, and otherwise conduct himself in a treasonous manner.

"It further appears that he had hired you to repair the ship, which he was offering for sale, apparently with the purpose of sneaking off in some fashion after he has secured the money he demands. The very type of long-lasting repair he requires shows the careful nature of the betrayal he is planning.

"Accordingly, you are herewith charged to destroy him as ordered in the name of Her Imperial Majesty, Innelda, Empress of the Solar System, Grand Descendant of the House of Isher. And now, if you wish to ask any questions—"

"None," said Neelan. "I understand everything."

It was immensely more than that. He felt better. His world was righting before the lifting consciousness of imminent freedom. There would be precious time to think things over and—

"One more precaution, Mr. Neelan." It was the empress, and Neelan faced her slowly, as she went on: "One precaution, and then you will be shown the room where you will spend the night."

She turned to her henchman. "Zeydel, bring on the Lambeth."

Neelan was glad after a moment when a man's voice—he wasn't sure whether it was Zeydel—directed him to sit down.

He sank heavily into his chair, and watched the glittery little instrument being set up. He wondered if he looked as sick as he felt. He should have known of course, but he hadn't expected a Lambeth.

Hadn't when he came right down to it remotely grasped that his death had been inevitable from the beginning.

As soon as they discovered that the doors of the spaceship would open at nine in the morning, and that Greer could offer no resistance, why, they would dispense with intermediaries.

His one advantage, so vital that it hurt even to think about it, was about to be stripped from him by a machine that needed only the proper questions to elicit the correct answers; and accordingly he had once chance—one slim chance:

He must agree to the main points. And mean it so that the machine would believe him. Believe him beyond all possibility of the registering needles being tremulous and uncertain. Therefore—

Neelan's eyes narrowed to slits. He must be prepared to kill Greer, if necessary. The problem of what he would eventually do with the man had been a dim question far back in his mind. But now there was no alternative.

Greer must die.

He saw that the instrument was being separated, divided into two parts. The focusing section stood on the tea table, its cone-shaped, radiant muzzle pointing at him. The empress held the receiver, with its bank of registering needles, on her lap.

She looked up, her lips parted for speech; and there was no doubt at all that the time had come. He lived or died according to his ability to control the next few minutes.

"Your majesty, may I speak?"

She gave him a quick look. Puzzlement was in that glance, and a swift suspicion. The grim thought came to Neelan that he was dealing with one of the sharpest, most agile minds in the Isher Empire.

The woman nodded finally, stiffly. "Very well."

As he began, he saw her gaze flick down to the needles. He had the sudden sensation that he was walking a tightrope with closed eyes, but there could be no hesitation:

"Naturally, I've been thinking over your commands. As you say, I have killed men before, and undoubtedly I can do it again. I don't like to shoot even an animal without giving it a chance but—"

He paused there, riffling over the words in his mind to see if so much as a single one of them didn't fit both his situation and theirs. They all did. Neelan went on:

"I'm not sure exactly all you want to know, but I swear that I learned of the job with Greer through the Public Ad Service. And I would like to say that, circumstances being what they are, I am prepared to kill Greer. I shall kill him with the revolver you gave me. There, is that what you want?"

It was of course, basically. He watched her, trying not to make it a glare of anxiety. To his relief he saw that she was not looking at him, but the needles. The empress said abruptly, sharply:

"Zeydel, come over here, and watch."

To Neelan, she said even more sharply: "Repeat that about killing Greer."

Neelan complied, silently cursing the efficiency of the machine that must be register-

ing at least fractionally the crosscurrents in his thought. It was Zeydel who broke the silence, respectfully:

"He means it, high majesty, but it's not clear. I would suggest that he is a man who will have to nerve himself to killing cold-bloodedly, and he won't do that until the time approaches."

The empress shook her head, impatiently dismissing that solution. There was more color in her cheeks. She stood up, began to pace the floor, her long skirt rustling. Several minutes passed, and then she faced Neelan. Her eyes were icy regions; her voice was an edged weapon that jabbed at him:

"Why did you volunteer that information, rather than wait for my question? You're hiding something, aren't you?"

She grabbed at the Lambeth receiver with feline eagerness. "Answer me that question," she said avidly. "Are you hiding something?"

Neelan sighed. He felt old and tired. Here was the dead end to all his hopes; and only courage remained. Courage and the knowledge of what defeat would mean.

"I refuse," he said slowly, weightily, "to answer that question."

He added after a moment: "Or any other question."

There was a hush that filled the room, an incredulous pause, heavy with suppressed shock. The climax, Neelan realized bleakly, had come upon them too suddenly. Their minds wouldn't adjust. The men looked at each other. The woman stood stone-still, her head bent forward, and her face had not a semblance of the smile that had graced it before. She said at last, almost sighing the words:

"You realize what you are doing? You are pitting yourself against the Crown, your lawful government."

Neelan tried to picture that as she meant it; and it was an unnerving picture. The Isher emperors and empresses had, to a vast extent, the affection of their subjects. Even those who opposed them recognized how great a family it was; *even* the Weapon Shops had never tried to overthrow them.

Neelan steadied himself. "I would like to point out that I have agreed to do what you ask. What I am hiding is a personal matter. It—"

He was cut off by a tinkle of laughter. He stared, startled by the sound, and by the look on the empress' face. The woman's laughter continued, musical but strangely unpleasant. It ended finally on an unnatural note.

"If it's a crime," she said, "however horrible, I absolve you from it. I pardon you. Do you hear that? No matter what it is, no court will ever try you for it. But I must know. Tell me."

Almost, she didn't look human. Her eyes flamed. Her face was a white mask of intensity. She stood straight and tall. Neelan said:

"I have agreed—"

She cut him off in astounded rage: "Are others involved? Then they, too, are guiltless. No court shall touch them. No investigation shall be made. If one is under way, it will be dropped. I pardon them. I forgive them everything, any crime, murder, lust, robbery, treason—*anything*."

There was nothing to say. Neelan sat in his chair, stiff, conscious of the woman pacing up and down in front of him, and that in her eyes was a stark disbelief.

"I'll give you," her voice burned, "a hundred million credits. Do you understand? More money than you can ever spend or gamble away. It will be deposited to your account in any bank this minute. Simply yield yourself to all questions, and everything that you can ever ask for from this world will be yours."

It was her utter desperation that did it. The tight, terrible feeling inside Neelan began to ease. He had never expected anything like this: The Empress of Isher acting like a mad woman.

She needed him. That was the reality behind her bloodthirsty threats, her wild offers. She couldn't get her men into the spaceship while Greer was there. Or rather—while her fevered brain imagined Greer was there, and in a position to launch the great ship into space.

"You mean, you won't do it?"

Her voice was a whisper. She swayed as if she was about to faint. Her eyes were wide. For a moment, she looked ill unto death.

"Your majesty—" It was Zeydel, anxious-toned.

"Silence!" Her voice was a whipsnap of sound. She waved at Zeydel, as if she was striking him.

She came forward, close to Neelan, peering

down at him where he sat as at some incomprehensible monster. Her voice, that remarkable, flexible voice, was suddenly almost caressing:

"You don't look insane. You look normal, a handsome young man. You can have no reason to want to die."

"Your majesty," Neelan said, "surely the fact that I have agreed—"

He must keep pressing that; it was the great hook that kept him hanging on this side of the death line. Desiring so much, she must accept the less, if more was not to be had.

She seemed not to have heard. Her voice, still soft, gentle, cut across his: "There are ways of making people talk."

That was chilling. The very quietness made the threat the more deadly. Neelan said:

"No drug will work on my definitely opposed will. I have the three advanced mind trainings, for memory, for control, for—"

"I was not thinking," the empress said caressingly, "of drugs."

She whirled. "Zeydel!" Her voice pierced the great silence of the room. "Zeydel, bring on the sensory vibrator."

She caught herself, and turned slowly back to Neelan. Her face was as pale as snow, her eyes looked old and bleached green.

"I'm sorry, Mr. Neelan," she said quietly. "You may not believe this, but I have never before had a man or woman physically tortured. Killed, yes; but not tortured. And yet I must overcome this fantastic refusal of yours. Won't you please be reasonable?"

Her appeal seemed without meaning. He felt remote, cold, and there was an awful sardonicism in him, that grew and grew to monstrous proportions until, finally, looking at her, he said:

"Your first torture, is it?" He laughed, and knew from the naturalness of that laugh that he was no longer quite sane. He finished coolly: "I am sure your majesty will survive the experience."

Her manner froze visibly. "Yes," she said at last through clenched teeth, "yes, *I* will survive."

TO BE CONTINUED.

IN TIMES TO COME

A NEW author takes first place in next month's issue—Lawrence O'Donnell's story, "Clash By Night," has the cover plate. It's a curious sort of background O'Donnell proposes, a civilization starting up on Venus after Man has been driven from a ruined Earth when atomic fire broke loose and spread over the whole planet. A civilization under the sea, in domes, because the appalling savagery of the land made it impossible for the first colonists to establish there, and their descendants, established under the sea, hadn't troubled to move out yet.

On the surface of the seas, and nibbling at the edges of the continents, were the mercenary soldier bands—the defense forces the cities employed to war against each other. The story is the tale of one of those mercenaries, knowing the futility of his function—the cities will get over that feuding and fight the savage jungles of the land eventually—and wanting to quit it. Every reason to quit the life of the warrior, too—all but one.

An excellent piece of action science-fiction for a first-timer, or an old-timer, for that matter. I've said before that most top-notch science-fiction writers turn in top-notch material very soon after they start trying—the first one, or the second or third, usually. It still holds. It would probably hold for a lot of people who've never quite had the urging to try pounding out the yarn they had in mind.

I most deeply wish some of them would now. It's heartbreaking, though, to have someone write a lovely yarn like "Clash By Night," raise my hope of one new man to replace some of the men now in the army and navy—and then find that, like O'Donnell, he's about to enlist. O'Donnell comes for the first time next month; I now find it's very apt to be his last for the duration. You can expect to hear from him again, though—about the spring of 1944 is my personal guess!

FLIGHT INTO DARKNESS

By Webb Marlowe

A ***STORY*** *of the reconstruction period after the war—and the only possible cure for a hundred-percent-convinced Fascist.*

Illustrated by Kramer

Dr. Linkman stepped rapidly across the subway platform and into the elevator that went to the street. He stood quiet, with soldierly erectness, as the elevator shot from a depth of three hundred feet below ground to more than five hundred above it. His hard face was expressionless, showing no sign of the triumph that boiled within him.

He left the elevator at the eighth level, walked a block down the glass-inclosed span and entered his apartment. He skirted the comfortable living room, went through a bedroom and entered a small closet. The closet was bare of furniture. What hung on the wall gave the tiny room distinction and lent it the air of being a shrine.

A large, framed photograph of Hoffman hung there. The fat, cruel face, magnified many times life-size, stared out challengingly. Below the picture hung a battered sword and an officer's dress helmet.

Dr. Linkman lifted his hand in the forbidden salute.

"At last, my Leader," he breathed. "The day of restoration is dawning!"

The door of the bedroom behind him opened. Linkman whirled, took a step forward, blocking the door of the closet. His crippled brother, Franz, limped into the room.

Linkman smiled thinly.

"Ah, Franz," he said. "I have good news for you."

The cripple's sad face lighted.

"Josef! They have made you manager of the plant?"

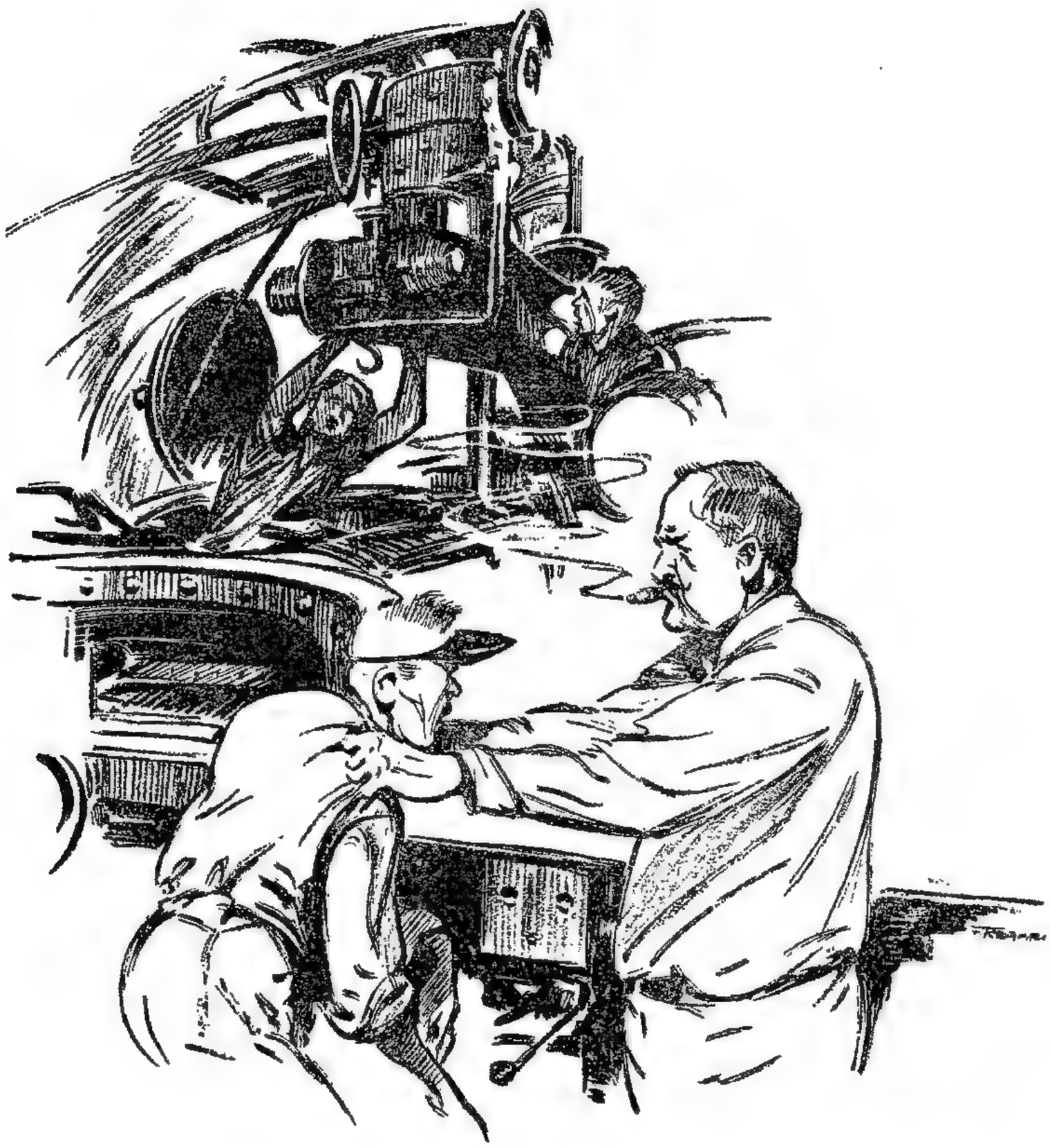
"Yes, I have worked my way up in the approved democratic fashion! After much pondering, our masters have decided that Colonel General Linkman is gone and the recently graduated *Dr.* Linkman is a thoroughly reformed character. Why, if I make good on this assignment, they may even let me—what do they say?—run for office! Bah!"

"But, Josef, will they . . . will they let you work on my—"

"Silence!"

Dr. Linkman strode forward and put both hands on his brother's twisted shoulders.

"You will forget that—as *they* have forgotten it! You hear?" He shook the boy a



little. "Yes, I will work on it! I will build it! But you must be silent about our work. Understand?"

Franz nodded. Then he caught sight of the picture.

"The Leader!" he gasped. "Josef! His picure is forbidden!"

Linkman drove his fingers into Franz's shoulders until the boy cried aloud.

"That, too, is another thing you will never mention," he said slowly.

"Oh, don't, Josef! You're hurting me! But it is against the law—"

His voice trailed off into broken sobs.

Linkman's fingers relaxed slowly, almost reluctantly, and his arms dropped to his sides.

"Against *their* law, boy. I obey the *Leader's* law!"

Franz's small body seemed to shrink even more.

"But my ship . . . your position . . . I thought—"

Linkman grinned down at him.

"Do not worry, little Franz. Your ship will be built. It shall be a tribute to *his* memory."

He turned back to the closet and saluted again. Then he closed the closet door, reverently.

"Come, Franz," he said, almost pleasantly, "it is time for dinner. And if you doubt me or my course, little brother, just remember how all *their* technicians laughed at you when you went to them with plans for a rocketship that would travel to the Moon and beyond!"

Hastings looked from General McClernand to Oliver. He shifted uneasily in his chair and looked down at the papers in his hand.

"After all, gentlemen," he murmured, "I'm just the head of a department and—"

"And I'm just an old soldier!" roared McClernand. He scowled fiercely at Oliver. "I don't pack any weight here, either."

Mark Oliver grinned amiably at the old man. His long figure slouched lower in the chair behind the big desk.

"Sorry, Hastings," he said gently. "Don't let the general's bickering with me embarrass you. And don't be alarmed because he takes your side of the matter."

"It isn't a question of sides, sir," Hastings said. "It's just a question of fact advanced by my department."

"Exactly!" bellowed McClernand. He leaned forward and pounded Oliver's desk. "Here's this soulless Department of Psychological Correction comin' out and challengin' your pet, Linkman! D'ye remember, now, how I kicked when you appointed him?"

"Of course. You won't let me forget." Oliver's quiet voice grew a little weary. "You just won't forget, Mac, that the war's over and we've got a job to do—without *prejudice*."

"Maybe I won't forget. But Hastings, here—he doesn't know anything about Linkman's past—an' he comes here—"

"I . . . ah, beg your pardon, general."

Hastings was acutely uneasy. The general's roars would never have been tolerated in the Psycho section. He looked at Oliver's face, placid under the old man's wrath. There was strength, there, underneath the calm. Why didn't he use some of it against the soldier's irrational outbreaks?

He cleared his throat again.

"If I might state my report," he ventured.

"Yes, Mac," said Oliver. "For Heaven's sake, pipe down and let Mr. Hastings state his case."

Oliver clasped his hands behind his neck and leaned back. His attitude was one of careless ease, but his eyes were intent on the psychologist.

"Very well, sir. *Ahem.*" He leafed through the report. "Ah, three mechanics, Cutlar, Vornov and Lockheim were discharged from the Zellerkraft plane factory. That's a native-managed concern."

"Your precious Linkman is the head man," growled McClernand.

"Charges were," continued Hastings, "maladjustment to occupation, lack of disciplinary balance, no receptivity to routine, general debility and so on."

"Put that in my language," ordered McClernand.

"Certainly. It means, simply, that they were lazy, incompetent, insubordinate and took poor physical care of themselves."

"Well," asked Oliver, "why have you come to me?"

He unclasped his hands and sat up straight in his chair.

"Just this, sir. The primary character and aptitude analyses that were made on these men gave no indication of such a development. When they were pronounced ready to begin work under our goverment, we had every reason to believe they would progress, not deteriorate."

"I see."

"Further—" Hastings swallowed and plunged on. "They have voluntarily applied to us for testing. Our preliminary examination gives no evidence that the alleged character reversal has taken place."

McClernand jumped to his feet again.

"See!" he snapped. "There's dirty work. That Linkman—"

"Just a minute!" Oliver did not raise his voice, but McClernand became quiet. "A psychograph of your emotional balance, Mac, might not give you a very high rating. Now, please be quiet until I'm through with Mr. Hastings."

He turned to Hastings and the young man fidgeted in his chair again. But Oliver's tone was kindly.

"Just what conclusion is your department trying to draw?" the director asked. "And why have you come to me?"

"Well, sir—" Hastings began to wish he'd never been promoted to such arduous jobs as arguing with big shots. "We can see no reason why such charges should have been preferred against these men. The manager of the factory is a native of doubtful antecedents—"

Oliver took out a pipe and began to fill it. He stared at McClernand's beet-red face. Although Oliver's face was impassive, Hastings could have sworn he saw the director's lips twitch.

"Tell me, Mac," the director asked, "just what your attitude is."

"Well," snarled the old man, "*I* think there's some of these natives that ought to be taken out and shot! Linkman's one of 'em. I know—I fought him for five years! But you think he's reformed! So—after he gets this job—he cans some employees under suspicious circumstances— *I* want it investigated."

Oliver applied the glowing tip of his lighter to his pipe. He puffed slowly for a few seconds, then leaned back easily in his chair.

"Gentlemen," he said, "it has been investigated. Dr. Linkman wrote me of his intention to discharge those men. With his letter, he sent affidavits from workmen in the plant, corroborating his charges. As a final point, I would remind you that their dismissal was approved by the plant guild."

Hastings looked down at his papers.

McClernand made a wordless noise.

Oliver got up from his desk and walked to the window. He stared out over the clean, white city, his view a tangle of arching traffic spans, needlelike spires of dwellings, spotted here and there by the dark green of hanging parks.

"Come here, gentlemen," he said.

They got up wonderingly and stood by him.

"See," he said. "That is *theirs*. Not ours, theirs. And we must give it back to them as soon as we can. We have a home of our own, you know, and I, for one, would like to get back to it. Because, fundamentally, we don't belong here."

Young Hastings then realized why Mark Oliver was director of this Occupied Area. He realized, more dimly perhaps, why he, himself, could never hold such a job.

Oliver turned from the window.

"That is why, Mac, and you, too, Mr. Hastings, that is why I have given Dr. Linkman his position. Why I will give others similar positions. I may make mistakes. If I do, I will remedy those errors as fully as I am able. But we must, all of us, run the risk of error—and run that risk cheerfully, so we can get our job done and go home."

He put his hand on Hastings' shoulder.

"Continue with your tests, Mr. Hastings. When you have a complete report, bring it to me."

"Yes, sir." Hastings put his papers in his brief case and walked to the door. There he turned. His eyes behind his glasses were very bright. "Thank you, sir," he said.

The door had barely slid shut behind him when McClernand grabbed Oliver by the arm.

"That was all very pretty, Mark," he growled. "And good for the youngster. But you can't fool these psychiatrists. They're scientists—"

"They're scientists as long as they agree with your prejudices, Mac. Now, let go my arm and I'll order up a drink for us."

McClernand straightened and moved back a pace.

"I'm an old has-been," he muttered. "My opinion doesn't count in these days of love and kisses for the enemy!"

Oliver threw his arms wide in a gesture of despair.

"For the love of Heaven, Mac," he cried, "just what do you suspect Linkman of doing?"

"I don't know. I only know he's in a spot to do harm if he's a mind to. And I know damn well he's a mind to! The butcher!"

Oliver shook his head wearily.

"Sorry, Mac," he said quietly. "I can't discuss it further. If I err, it's got to be on the side of tolerance. That's why I'm here."

"All right, all right!" McClernand stamped to the door. "Just remember, son, you can't teach an old dog new tricks!"

If it had been an old-fashioned door, he would have slammed it shut behind him.

Dr. Linkman glanced at his wrist watch. It showed five minutes past five. In the outer office he could hear his secretary close her electrotyper.

She appeared in the doorway, coat in hand.

"Good night, Dr. Linkman."

Linkman smiled benevolently.

"Good night, my dear."

She frowned a little.

"Don't stay late, sir. You've been working awfully hard lately."

"Now, now," he said. "You run along and don't worry about me. You must enjoy yourself—not think of an old man like me."

She shook her curly head.

"You're not old, doctor."

She smiled again as she went out. Linkman heard the office door slide shut behind her. The benevolent look was replaced by a scowl.

"Little flirt," he grated. "Women in industry—bah! Their place is in the home, bearing children for the race!" He shrugged. "Ah, well. That, too, will change."

He walked over to the production chart on the wall.

"Twenty-three units per day," he mused. "And they allow me just twenty-three units of raw materials. Our masters are good accountants." He moved back to his desk and picked up a scratch pad. His brows contracted as he figured. "Hm-m-m. To get material, I must lessen the quality of the plant's output. How long, then, before the inspectors find out?"

There was a rapid double knock at the door. Linkman ripped the sheet off the pad and tossed it down the waste chute.

"Come in," he called.

A man in working clothes stepped in, locked the door behind him and walked with swift, military strides into Linkman's office.

"My general!" he saluted.

"Major Falkayn!" Linkman returned the salute. "Sit down, major." He pushed a box of cigars across his desk. "Smoke and be comfortable. You have earned relaxation."

Falkayn slumped down in a leather chair, leaned back and closed his eyes as he puffed on the cigar. Linkman, too, lit one and the two men smoked silently for a few moments. Then Falkayn spoke slowly:

"This is wonderful, sir. The first time I have relaxed with a social equal in ten years! I have been"—his slow voice grew passionate with disgust—"a workman! A faithful member of one of those accursed guilds! Pah!"

Linkman smiled thinly.

"*I* have begged my way into a university." He raised a clenched fist. "I, a soldier, have studied plant management and the principles of democracy! I have allowed myself to be—educated!"

He broke into a sharp, grating laugh.

"But that is past. Soon, you and I will wear uniforms again!"

His cold eyes stared off into space over Falkayn's head. He seemed to be seeing a vision for his muscles tensed, his shoulders went back. Falkayn waited respectfully for a moment, then coughed slightly.

Still staring, Linkman said, "I will make a great leader, Falkayn. And you shall be my deputy. Give me your report."

He leaned back slowly and listened with half-closed eyes.

"Yes, sir. I have the great pleasure to report that the hull is finished. The left bank of tubes is installed. The right bank will be in place in another day. Tonight, we are starting to weld the fuel tanks."

"An operation of some four days," mused Linkman. "And the storage of materials?"

"We have accumulated a four-months' supply of all necessities. Our munitions are limited, though."

"We must get more! We must work faster!"

Falkayn leaned forward in his chair.

"But, general. We must *steal* armament. And those faithful to the Leader's memory are few—very few. I, myself, have worked twenty hours a day—my regular shift in the plant and the balance on our ship."

Linkman stood up. Falkayn followed suit and stiffened to attention.

"These excuses are not valid," rasped Linkman. "If you cannot execute my orders, I'll replace you, major. I want everything ready within one week from tonight!"

Falkayn saluted without speaking.

Linkman started to sit down. A faint hum seemed to come from his desk. He jerked open the center drawer. The hum grew louder.

"Keep talking," Linkman hissed. "About the ship. And loudly!"

As the major continued an expressionless monologue about the ship's construction, Linkman reached to the back of the drawer and pressed a stud. The hum stopped. Linkman's hand came out, clutching a flat pistol.

Linkman ran past Falkayn.

"Stay here," as the other turned to follow. "Keep talking."

His feet making no sound on the feltex carpet of the outer office, Dr. Linkman ran to the door, snapped the lock and slid it open.

A man crouched there, his ear glued to a dictascope.

He started to rise and Linkman shot him twice. The listener collapsed.

"Falkayn!" Linkman bent and lifted the body. "Wipe the floor clean of any blood," he grunted. "Then lock the door again."

He carried the body into his office, dropped it to the floor and bent to search the pockets.

Falkayn peered over his shoulder.

"Who is he?"

"An Intelligence man, of course. I would think that McClernand set him on me."

He looked at the miscellaneous data from the dead man's pockets.

"Nothing," Linkman muttered. "As I expected, of course."

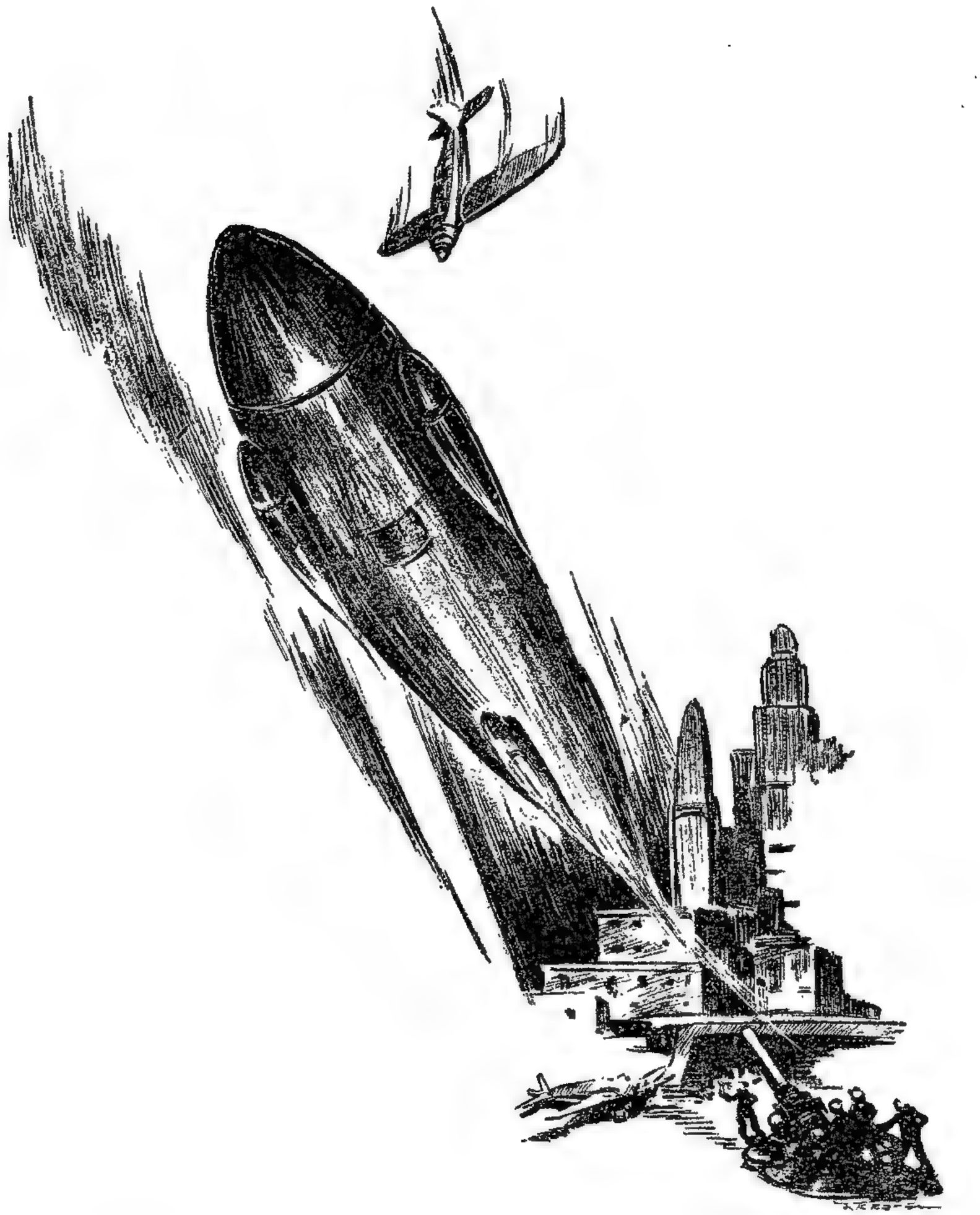
He straightened, kicked absently at the corpse, then walked back to his desk.

"Yes," he said, "it must be McClernand. The old fool has more sense than the rest of them." He pointed at the corpse. "To the furnaces with that, major. If they have no evidence, the fools won't act, no matter how much they suspect."

The humming started again.

Linkman drew the pistol from his pocket. There was a light knock at the door.

"Yes?" Linkman called.



"Oliver, Dr. Linkman."

Sweat started on Linkman's brow. Falkayn drew a pistol, but Linkman gave a wordless snarl and shook his head. He put his gun back in the drawer.

"A moment," he called.

His frantic eyes lighted on the clothes locker. He stepped over and took out his coat and hat. He beckoned to Falkayn.

"In here," the doctor whispered. "Both of you. Stand on him, if necessary. Stay there until I return."

Falkayn dragged the body across the room. Linkman looked for bloodstains, saw none. He tossed Falkayn's cigar into the waste chute and walked unhurriedly to the door. The detector in the drawer still hummed.

"Good evening," the doctor bowed to Oliver. "You are just in time. I was just leaving."

"Glad to see you," smiled Oliver. "Although I have a complaint to make."

"A complaint?"

"Yes. You're working too hard, doctor."

Linkman smiled in turn.

"One must work to do the job," he said.

He still stood in the doorway, holding his hat and coat so that they were very apparent to his visitor.

"But not too hard," replied Oliver. "Have you an engagement, doctor? If not, I'd like

to take a look around and then—perhaps you might have dinner with me."

"You are very kind." Still smiling, Linkman stepped back and gestured toward the inner office. "I am free for the evening. Shall we take a look at the charts, first? I have some figures that give me much satisfaction."

"I know you have."

As he followed Oliver into the office, Linkman stared balefully at the director's broad back. A knife between those big shoulders—he shrugged off the idea regretfully. It was yet no time for personal pleasures.

Oliver stood where the corpse had lain and glanced around approvingly.

"Very pleasant." He took a step toward the big production chart.

"You've done well, doctor. I am sincerely glad for—"

He broke off. Linkman stiffened. Both men heard the faint hum of the detector. Oliver raised his eyebrows and half turned back to the doctor.

"An infernal machine?" He smiled, but his eyes were grave.

"Not at all." Linkman returned the smile. "Just a little gadget I've developed myself. (It was really Franz's invention.) An alarm, based on the photoelectric principle."

"So? Let me see it. Perhaps you've got some patents coming to you."

Oliver stepped around behind the desk and waited expectantly. Linkman tossed his coat and hat on the chair and opened the drawer. Too late, he saw his pistol exposed to view.

"Really, Dr. Linkman," Oliver said slowly. "I don't quite understand this. The law forbids all nonmilitary citizens the possession of weapons." He stared hard at the doctor. "Nor do I quite understand just why you feel the need of an alarm, here in your private office."

Falkayn stepped from the locker, a stubby oxy-gun pointing at Oliver.

"Put up your hands, director!" he snapped.

"Falkayn! You are too zealous!" Linkman shook with rage.

"If I may presume, sir," retorted Falkayn, "the snooping swine would have handled the gun."

Linkman calmed visibly.

"Perhaps. I apologize, major."

The two bowed stiffly.

Oliver had not lost his calm. He looked from one to the other, dominating them with his quiet presence.

"May I ask, gentlemen," he said, "what these . . . these theotricals mean?"

Linkman raised his hand to eye level and held it for a moment, staring somberly at his bent fingers. Then he lashed out viciously, smashing Oliver in the mouth. Oliver's knees buckled, but he did not fall. He pulled himself erect and wiped the blood off his swelling lips.

"I was wrong about you, doctor. Wasn't I?" His voice was almost conversational in tone. "But will you explain just how I was wrong?"

Linkman rubbed his knuckles absently.

"He must be disposed of," he muttered. "But how? When? He will be missed. There will be a search—"

He paused. Then he reached for a phone. He dialed a number, waited for a moment, then the mechanical voice of the director's fone-man intoned into the receiver.

"The director is not here. The director is not here. He left at six. May be at his club at seven. If not, try his residence. The director is—"

Linkman switched off the phone. He grinned evilly at Oliver.

"You should have mentioned you were coming here," he gloated. "No one but the plant doorman knows you are here." He turned to the major. "Take care of the doorman, Falkayn. Put one of our men in his place."

Falkayn saluted. Oliver's eyes narrowed when he saw the salute.

"Put the doorman's body and that spy's into a furnace. Be sure you leave no traces."

Linkman turned to Oliver and his eyes began to glow.

"As for you, my dear director," he sneered, "you shall live—for a while. You shall even start our flight with us!"

"Your *flight?*"

"Yes." Linkman's voice rose to a scream. "For five years I've todied to you. I've gone to school and earned your gracious approval and become a good citizen! Do you know why I've debased myself so? Why I've licked your boots to get this factory? I'll tell you! I've found a few of the faithful left. I've brought them here to work with me. We are building a rocketship!"

"A rocketship?" Despite the pain it caused him, Mark Oliver began to laugh.

Falkayn stepped forward and slapped him.

"You will not laugh when the Leader speaks," he said.

"Yes." Linkman seemed oblivious of the interruption. "A rocketship to conquer space. We'll find a planet—make it ours—build a new race. One that lives and dies by my Leader's teachings!"

Oliver gazed at him with horror-struck eyes.

"Man," he said thickly, "you're insane."

Falkayn slapped him again, harder.

"You will not speak of him so," he cried. "He has become our Leader. And he will lead us to a new world. We have built our ship, here—right under your nose. I, myself, am an engineer. I know the ship will work."

"Our plans are well developed," sneered Linkman. "The ship is almost done. And, in return for your kindness to me, I shall take you with us—part of the way."

Oliver gave him a long, searching look.

"Yes," he said slowly, "I was wrong about you, Linkman." He wiped his lips with the back of his hand. "I won't plead with you," he went on, "or argue, for you are mad—mad with the worst madness that ever infected mankind!"

They both started toward him, but he lifted his hand and they halted. He grinned at them.

"Creatures of habit," he mocked. "Aren't you? And, I solemnly assure you, both of you, your habit is and always will be—failure!"

Linkman smashed him across the face with the gun barrel. As Oliver fell, Linkman kicked him.

Falkayn gazed at him admiringly.

"The Leader would be proud of you, sir," he whispered.

At ten thirty in the morning, two days later, Linkman walked briskly through the engine-assembly room of his plant, nodding and smiling to his workers. He checked the speed of the conveyor belts, stopped to comment admiringly on an assembled engine, clocked the speed of the automatic cranes as they shuttled from one assembly room to the next. Then he walked out of the plant and across the yard to the edge of the small testing field. He was not surprised to see two men, in the uniform of the Civil Guard, examining a row of planes lined up for the arrival of the test pilots.

"Good morning, gentlemen," he called. "Checking specifications?"

They returned his greeting without warmth. They were not civil servants, but old soldiers who had received no training in toleration of a former foe.

"We have been examining your plant," one of them said.

"Examining the plant? But I would have been glad to escort you."

"We were searching it—if you want to know the truth."

Dr. Linkman drew himself up. His tone was a nice blend of injured dignity and weary patience.

"But why, gentlemen? Are there any charges against me?"

"Nope. No charges." The Guard turned to his companion. "Nothing here, Jed. Let's go."

They tramped across the field and out of the plant gate. Linkman grinned after them, then bent his head slightly and stared at the ground. He stamped his foot lightly.

"Poor, ignorant swine," he laughed. "It was right below you, all the time!"

He returned to the plant, walking unhurriedly. Through the assembly room he went and an elevator took him from there to the forge rooms, one floor down. Air conditioning fought successfully with the blasting heat of electric furnaces. Crane cars passed by overhead, men ladled molten steel into buckets, hammers smashed glowing blocks into new, hardened shapes. All were too busy to note the entrance of Linkman.

He strolled about carelessly for a moment, then stepped around the side of a furnace. He felt along the insulated wall of the furnace near its junction with the side of the building. As he probed, a section of the furnace wall turned on an axis and Linkman slipped through the opening revealed and passed down a short flight of steps.

It was simple enough. During the war, a bombproof cellar had been dug out below the plant and there a duplicate factory had been created, fitted with machinery and living quarters for the workmen. It had been used, too, when enemy bombs had shattered the plant above.

When peace and the allied invaders came, the surface plant had been recommissioned. Its underground copy was stripped of its machinery and sealed up.

But Linkman knew about it. It was being used.

He stopped at the foot of the stairs, as he always did, and gazed silently at the monster shape that gleamed silently in the dimness. He lifted his hand in salute.

"You'll leave this hole, soon," he said softly, "and go where you belong, up through the sky to the stars!"

He walked along the seamless hull, gazing at the blast tubes, the steering vanes higher than himself. A port was open and he climbed in. The interior of the ship was a madhouse. A pressure lift hoisted the fuel tanks while workmen welded them into place. Men trotted nimbly along the lower catwalk, bent double with crates of supplies. Linkman made his way to the upper catwalk and the pilothouse.

Major Falkayn turned from a calculator.

"Good morning, general! I'm glad to say that we're ahead of schedule."

"Yes. I noticed the fuel tanks. How about the fuel?"

"It is being mixed."

"Good."

Linkman went up to the instrument bank and stared down at the rows of dials. He fiddled absently with a control.

"I could wish some of our scientists had remained faithful," he muttered. "We could use them, now."

"Lieutenant Raeder was with the Fleet," Falkayn ventured. "He is thoroughly grounded in astronomy."

Linkman nodded.

"Yes. And Colonel Memsur was in Chemical Warfare." He gazed around the crowded room. "We will not be comfortable. It will be a voyage for men."

"But, of necessity, some women will take it," chuckled Falkayn.

"Yes. I am glad that some of our men are married. Otherwise, there would have been further complications."

He stepped out of the room and back along the catwalk.

"Some of the wives are young," said Falkayn. "And attractive."

Linkman withered him with a glance.

"*I* shall beget no children," he said. "None now living shall take my place. As Fate brought me to succeed the Leader, so shall I leave it to Fate to bring forth *my* successor."

He stopped and leaned over the rail. Below him was the engine room. Men darted in and out among the intricate machinery of the converters, making last-minute adjustments on the conduit system. Far to aft he could hear a faint roar as the auxiliary motor, designed to carry the ship past the friction of the atmosphere, was being tuned up.

"To think," he said, "that, surrounded and dogged by my enemies, I have built this in only four months. Now, we must go. I have the Leader's intuition. It tells me that we must hurry!"

Falkayn shrugged.

"Test the wiring hookup, set up gun emplacements and—"

"Gun emplacements! Why have you delayed that?"

"They were not in the plans."

"Oh, yes." Linkman smiled grimly. "My young brother would not have designed them. I will speak to him at once."

Linkman went down the steps so fast he almost lost his footing. Why, why did he always have to ask and wheedle—instead of commanding? Naturally, Franz would not have designed armament—so he, Linkman, must postpone until the last, dangerous moment to make known their desperate need. Thank all the gods, the days of deception were over.

He jerked open the door of Franz's little cubbyhole. The cripple turned on his high stool and gave his brother an uncertain smile.

"Josef!" he exclaimed. "How are—"

"Never mind," the other rasped. "I have a task for you. You must design gun emplacements for each port. To fire when the port is open, but the gun must have plenty of protection. Make it simple."

"Guns?"

"Yes, of course. One 6-inch gun to a side. With two 107s at each of the other ports."

"But, Josef!" Franz climbed down from his stool and limped toward his brother. "Armament is forbidden! The government would never accept our ship if it were designed for war!"

Dr. Linkman lighted a cigar. He inhaled deeply and blew the smoke at Franz. His lips curled in a sardonic grin.

"My little Franz," he murmured. "My little, innocent brother."

He stared hard at the younger man until Franz's eyes dropped guiltily.

"Did you think," Linkman went on with extreme gentleness, "that I was really developing this ship for the government? That I was going to give the greatest thing in history to this government that has killed our Leader and destroyed his teaching?"

"But I . . . I thought—"

"Yes?" Linkman took a step forward. "You thought what?"

"That you . . . you had changed. That you believed in the new government—"

"Ah!" Linkman threw back his head. "I am a success, indeed, for I have deluded my own brother."

He stepped forward again, until he was very close to Franz. He reached down and tilted the other's chin up.

"My boy," he said softly, "this government will never know of your ship—until it and thousands like it come back from the stars to destroy them. We leave in a few days. For Venus or Mars—there to set up the Leader's government! In your ship . . . in *our* ship for, although you are weak and feeble, you are still one of us!"

There was a discreet tap at the door. Linkman turned. A grimy workman stood at rigid attention.

"Your pardon, my general," he said, "but the prisoner demands to see you."

"I'll come along shortly," Linkman answered.

Franz stared wide-eyed as the workman saluted, then withdrew.

"Yes," grinned his brother. "An old soldier of mine. As all of them are. They follow me to a new world."

He reached out and grasped the boy's shoulders, dug his fingers in, deep.

"You may come, too, if you like," he said softly. "Otherwise—well, the invaders must not be able to follow me." He gave the boy a push. "Get busy on those gun mounts. I must visit that prisoner—our great director, Mr. Oliver!"

Franz slumped there against the table, dazed and sick. His first reaction was one of fear for his brother. His brother kidnaped Mr. Oliver—they would execute him for that. No—his brother was going to the Moon—or was it Mars—and there would be war again.

He moved weakly toward the door.

They would take him with them. Take him to the New World. He shook his head. No. Long ago, before his people had lost their war, he had known. Known with the wisdom of childhood that only his brother's eminence had kept him, crippled Franz, alive. There was no place for cripples in a state of supermen.

He peered out of the door. He did not know Oliver. But Oliver's government had allowed him to go to school and study the mathematics that he loved. He saw his brother go to the door of an abandoned tool closet and open it.

Mark Oliver looked up and focused his eyes on Linkman.

"I wish a drink of water," he said slowly and clearly.

"Sorry, I haven't time." Linkman laughed at his own humor.

"Give me a drink. Then let me out of here."

Linkman's laugh reverberated throughout the tiny room.

Oliver forced himself to concentrate. He licked his bruised lips with a swollen tongue. It was hard to talk.

"You are really going through with this madness?"

"Certainly."

Oliver closed his eyes, then forced them open.

"I have made a mistake in you," he said thickly. "A great mistake."

"You are all such fools," Linkman said casually.

"Not . . . not such as you. You . . . will always fail."

"Even now?" chuckled Linkman.

"You will do something . . . make some mistake . . . your kind doesn't *know*—" Oliver fainted. He did not feel it as Linkman kicked him before he went out.

"I wish, general," Blake, Director of Police, said irritably, "you would stop that confounded pacing!"

General McClernand took two steps to the facsimile receiver, then three to the electrofile, then two back to the director's desk. He bent over Blake's desk and thrust out his lower lip.

"Then do something!" he bellowed.

Blake ran a hand through his gray hair.

"General," he said patiently, "will you either shut up or give me some evidence?"

He gestured toward Hastings, who was manipulating a file separator.

"His report on the discharged workmen is the only concrete, factual bit of knowledge anybody has given me in the whole affair! Anything new, son?"

Hastings shrugged.

"Not yet, sir."

The director beat his palm with a hard fist.

"That's it, General Mac. I have nothing to go on!"

McClernand shoved a pipe in his mouth and bit hard. The bowl came loose in his hand. He hurled the wreckage to the floor.

"You . . . you're just like the rest—soft!

You can't do anything!"

Blake cursed.

"I put a secret operative on Linkman. Against the law, of course, but you asked me to. The man disappeared before turning in a single report. Hastings has dug up enough information to bring before Mr. Oliver. But Mr. Oliver disappears. So—again on your say-so—I sent two Civil Guards to search Linkman's factory. They couldn't find a thing!"

He leaned back in his chair and scowled at McClernand.

"The whole thing rests upon your personal dislike of Dr. Linkman. A dislike completely unsupported by factual evidence!"

"Humph! Do *you* like him?"

"No. I served on your staff—remember?" He grinned wryly. "But damn it, General Mac, we made these laws and we've got to obey them!"

Hastings stopped feeding cards into the separator.

"Ah, gentlemen," he ventured, "speaking outside the law, now, I think we are right in suspecting Dr. Linkman. My investigations have convinced me that his behavior mold is too set, his basic inclinations too well directed, to ever admit the possibility of fundamental change in his character."

"Which means, Mac," came a tired voice from the doorway, "that you can't teach an old dog new tricks. Just as you said."

The three turned as though on a single axis.

Oliver leaned against the door jamb. His battered lips tried to grin as they rushed to him. McClernand reached him first.

"Where you hurt?" he growled.

Hastings pushed a chair forward.

"I'm all right," Oliver said. "Some brandy, Blake, if you please. Round up all the men you can. Mac, call out the whole Civil Guard. We're going over to Zellerkraft—in a hurry!"

"So it was Linkman!" cried the general.

"Yes." Oliver stood up. His eyes were clear again. "Prepare for a shock, gentlemen. Linkman's crippled brother has designed a rocketship for interplanetary travel. Linkman has built the ship in his factory!"

They stared.

"Yes, it's true." Oliver rubbed his aching head. "Linkman plans to conquer another planet."

Hastings nodded.

"Part of his proper pattern," he said.

Blake clicked off the phone he'd been using.

"Car's ready for us." He smiled vaguely. "I don't believe this, chief, but I'm at your orders."

"I don't believe it, either," said McClernand.

"It's true. I've seen it. I called at Linkman's office—just after he'd finished killing a man—"

"My man." Blake's voice was quiet. "Let's go."

"Not Oliver," grunted McClernand.

Oliver took a shaky step toward the door.

"Yes," he said firmly. "I'm going. This is partly my fault—and wholly *our* fault. I imagine our engineers laughed at the crippled boy when he submitted his designs."

He took another, firmer step.

"I can make it. No arguments, Mac. Remember, I rank you."

Their car spiraled up to a traffic-tree span and shot along toward the factory.

"Just what did happen to you?" asked Blake.

"They held me prisoner in an abandoned lower level of the plant," Oliver answered. "The ship's there. I think, somehow, it will work."

"To think *they* should have invented it," murmured Hastings.

"No." Oliver leaned out of the car window and took a deep breath of the night air. "The boy is one of us. He thought he was building it for us—to prove it could be done, you know. Today, his brother told him the truth. Tonight, he helped me get away."

"Here we are," said Blake. "There's a car of Guards!"

McClernand peered over the side.

"Take the main ramp off the span," he said. "I see some people out on their testing field."

"They can't be starting already!" cried Oliver. "Hurry, Blake!"

They piled out of the car before it was fully stopped. Blake gave a low whistle and the Guards came running up. The great gate was locked, but a flamer blasted it. They surged through and rushed toward the building.

"Wait!" called Blake. "What's that on the ground?"

"No lights, now," ordered McClernand.

"I can see," grunted Oliver. "It's young Linkman."

Despite the pain in his ribs he knelt by the prone figure. The cripple lifted his head a little.

"Director!" he cried weakly. "Josef forced me to tell . . . I helped you . . . then he shot me.

They are taking my ship . . . auxiliary motor only until they . . . they—"

The twisted body collapsed. Oliver reached forward and touched the big head. Then he rose to his feet.

"Come on," he said.

There was a throbbing roar from the other side of the building. The gleaming snout of the rocketship raised itself slowly above the roofline. They ran around the side of the building to the testing field. But they were too late.

"Fire, damn it!" bellowed McClernand.

The Guards gave a ragged volley. They could not miss, but the small shells exploded harmlessly against the sides of the ship.

"After all, they built it to ward off meteors," said Oliver.

"Some of you phone Aërial Defense," barked McClernand. "Blake, have a man get through to Grauheim Field and have every ship go up."

"Go ahead," Oliver said, "but we'll never catch them. Once they get high enough for rockets—"

"Then to the devil with them!" snarled McClernand.

Oliver watched the ship lunge skyward, auxiliary props making a furious drone.

"No," he said. "Don't you see, Mac, they'll be back!"

"Bah, they'll never make it!"

"Yes, they will. Look what Linkman himself has done. They'll make it—unless we stop them again."

They stared at each other, each with eyes that saw something other than the man before him. A sky filled with wheeling, diving planes, raining bombs on this white, immaculate city they had helped build. This, and all other cities, smashed by tanks, scarred with bombs beyond the recognition of peaceful eyes.

Oliver turned away slowly and his eye caught the row of new planes. Linkman had not bothered to cover them against the dew. He stared at them. Mail planes, standing sleek and trim, lined up for an initial test. Something clicked in his mind. He looked over his shoulder at the giant rocketship, then ran toward the planes.

"Hey!" yelled McClernand.

He took a step, then broke into a run. But he was old. Oliver reached a plane, slid open a port and jumped in. The elevator motor roared and the plane shot up.

McClernand stopped, panting. Blake and Hastings came alongside him and stared skyward.

"What's he going to do?" asked Blake, although he knew.

"Ram it, of course." Hastings' voice was as expressionless as ever. "Only way to stop it, you know."

The plane's drive turned over, then roared into life. It seemed to leap forward in the air. A Guard came out of the plant office, stopped short and looked up. Searchlights went on over the city, picked out the rocketship easily. The plane, tiny now, sped after it.

They saw the plane go high, above the ship, and poise there.

Then it dived.

For one moment they saw it on its way. Then the two met with a faint crash. The rocketship staggered and the smashed plane fell off, toward the earth. The big ship nosed down, seemed to recover, then, with an awful roar, it exploded.

The watchers turned away.

It was the unemotional Hastings who pronounced Oliver's epitaph.

"Now," he said, "*we* must build one."

THE END.

MIMSY WERE THE BOROGOVES

By Lewis Padgett

THIS is the first science-fiction story that I know of which has considered the children's toys of the far future. Simple little item—a time-machine inventor trying out his gadget sending back a few discarded children's toys. But—what toys!

Illustrated by Kolliker

There's no use trying to describe either Unthahorsten or his surroundings, because, for one thing, a good many million years had passed since 1942 Anno Domini, and, for another, Unthahorsten wasn't on Earth, technically speaking. He was doing the equivalent of standing in the equivalent of a laboratory. He was preparing to test his time machine.

Having turned on the power, Unthahorsten suddenly realized that the Box was empty. Which wouldn't do at all. The device needed a control, a three-dimensional solid which would react to the conditions of another age. Otherwise Unthahorsten couldn't tell, on the machine's return, where and when it had been. Whereas a solid in the Box would automatically be subject to the entropy and cosmic-ray bombardment of the other era, and Unthahorsten could measure the changes, both qualitative and quantitative, when the machine returned. The Calculators could then get to work and, presently, tell Unthahorsten that the Box had briefly visited 1,000,000 A. D., 1,000 A. D., or 1 A. D., as the case might be.

Not that it mattered, except to Unthahorsten. But he was childish in many respects.

There was little time to waste. The Box was beginning to glow and shiver. Unthahorsten stared around wildly, fled into the next glossatch, and groped in a storage bin there. He came up with an armful of peculiar-looking stuff. Uh-huh. Some of the discarded toys of his son Snowen, which the boy had brought with him when he had passed over from Earth, after mastering the necessary technique. Well, Snowen needed this junk no longer. He was conditioned, and had put away childish things. Besides, though Unthahorsten's wife kept the toys for sentimental reasons, the experiment was more important.

Unthahorsten, left the glossatch and dumped the assortment into the Box, slamming the cover shut just before the warning signal flashed. The Box went away. The manner of its departure hurt Unthahorsten's eyes.

He waited.

And he waited.

Eventually he gave up and built another time machine, with identical results. Snowen

hadn't been annoyed by the loss of his old toys, nor had Snowen's mother, so Unthahorsten cleaned out the bin and dumped the remainder of his son's childhood relics in the second time machine's Box.

According to his calculations, this one should have appeared on Earth, in the latter part of the nineteenth century, A. D. If that actually occurred, the device remained there.

Disgusted, Unthahorsten decided to make no more time machines. But the mischief had been done. There were two of them, and the first—

Scott Paradine found it while he was playing hooky from the Glendale Grammar School. There was a geography test that day, and Scott saw no sense in memorizing place names—which in 1942 was a fairly sensible theory. Besides, it was the sort of warm

spring day, with a touch of coolness in the breeze, which invited a boy to lie down in a field and stare at the occasional clouds till he fell asleep. Nuts to geography! Scott dozed.

About noon he got hungry, so his stocky legs carried him to a nearby store. There he invested his small hoard with penurious care and a sublime disregard for his gastric juices. He went down by the creek to feed.

Having finished his supply of cheese, chocolate, and cookies, and having drained the soda-pop bottle to its dregs, Scott caught tadpoles and studied them with a certain amount of scientific curiosity. He did not persevere. Something tumbled down the bank and thudded into the muddy ground near the water, so Scott, with a wary glance around, hurried to investigate.

It was a box. It was, in fact, the Box. The gadgetry hitched to it meant little to Scott, though he wondered why it was so fused and burnt. He pondered. With his jackknife he pried and probed, his tongue sticking out from a corner of his mouth— Hm-m-m. Nobody was around. Where had the box come from? Somebody must have left it here, and sliding soil had dislodged it from its precarious perch.

"That's a helix," Scott decided, quite erroneously. It was helical, but it wasn't a helix, because of the dimensional warp involved. Had the thing been a model airplane, no matter how complicated, it would have held few mysteries to Scott. As it was, a problem was posed. Something told Scott that the device was a lot more complicated than the spring motor he had deftly dismantled last Friday.

But no boy has ever left a box unopened, unless forcibly dragged away. Scott probed deeper. The angles on this thing were funny. Short circuit, probably. That was why—*uh!* The knife slipped. Scott sucked his thumb and gave vent to experienced blasphemy.

Maybe it was a music box.

Scott shouldn't have felt depressed. The gadgetry would have given Einstein a headache and driven Steinmetz raving mad. The trouble was, of course, that the box had not yet completely entered the space-time continuum where Scott existed, and therefore it could not be opened. At any rate, not till Scott used a convenient rock to hammer the helical non-helix into a more convenient position.

He hammered it, in fact, from its contact point with the fourth dimension, releasing the space-time torsion it had been maintaining. There was a brittle snap. The box jarred slightly, and lay motionless, no longer only partially in existence. Scott opened it easily now.

The soft, woven helmet was the first thing that caught his eye, but he discarded that without much interest. It was just a cap. Next he lifted a square, transparent crystal block, small enough to cup in his palm—much too small to contain the maze of apparatus within it. In a moment Scott had solved that problem. The crystal was a sort of magnifying glass, vastly enlarging the things inside the block. Strange things they were, too. Miniature people, for example—

They moved. Like clockwork automatons, though much more smoothly. It was rather like watching a play. Scott was interested in their costumes, but fascinated by their actions. The tiny people were deftly building a house. Scott wished it would catch fire, so he could see the people put it out.

Flames licked up from the half-completed structure. The automatons, with a great deal of odd apparatus, extinguished the blaze.

It didn't take Scott long to catch on. But he was a little worried. The manikins would obey his thoughts. By the time he discovered that, he was frightened, and threw the cube from him.

Halfway up the bank, he reconsidered and returned. The crystal block lay partly in the water, shining in the sun. It was a toy; Scott sensed that, with the unerring instinct of a child. But he didn't pick it up immediately. Instead, he returned to the box and investigated its remaining contents.

He found some really remarkable gadgets. The afternoon passed all too quickly. Scott finally put the toys back in the box and lugged it home, grunting and puffing. He was quite red-faced by the time he arrived at the kitchen door.

His find he hid at the back of a closet in his own room upstairs. The crystal cube he slipped into his pocket, which already bulged with string, a coil of wire, two pennies, a wad of tinfoil, a grimy defense stamp, and a chunk of feldspar. Emma, Scott's two-year-old sister, waddled unsteadily in from the hall and said hello.

"Hello, Slug," Scott nodded, from his altitude of seven years and some months. He

patronized Emma shockingly, but she didn't know the difference. Small, plump, and wide-eyed, she flopped down on the carpet and stared dolefully at her shoes.

"Tie 'em, Scotty, please?"

"Sap," Scott told her kindly, but knotted the laces. "Dinner ready yet?"

Emma nodded.

"Let's see your hands." For a wonder they were reasonably clean, though probably not aseptic. Scott regarded his own paws thoughtfully and, grimacing, went to the bathroom, where he made a sketchy toilet. The tadpoles had left traces.

Dennis Paradine and his wife Jane were having a cocktail before dinner, downstairs in the living room. He was a youngish, middle-aged man with gray-shot hair and a thinnish, prim-mouthed face; he taught philosophy at the university. Jane was small, neat, dark, and very pretty. She sipped her Martini and said:

"New shoes. Like 'em?"

"Here's to crime," Paradine muttered absently. "Huh? Shoes? Not now. Wait till I've finished this. I had a bad day."

"Exams?"

"Yeah. Flaming youth aspiring toward manhood. I hope they die. In considerable agony. *Insh'Allah!*"

"I want the olive," Jane requested.

"I know," Paradine said despondently. "It's been years since I've tasted one myself. In a Martini, I mean. Even if I put six of 'em in your glass, you're still not satisfied."

"I want yours. Blood brotherhood. Symbolism. That's why."

Paradine regarded his wife balefully and crossed his long legs. "You sound like one of my students."

"Like that hussy Betty Dawson, perhaps?" Jane unsheathed her nails. "Does she still leer at you in that offensive way?"

"She does. The child is a neat psychological problem. Luckily she isn't mine. If she were—" Paradine nodded significantly. "Sex consciousness and too many movies. I suppose she still thinks she can get a passing grade by showing me her knees. Which are, by the way, rather bony."

Jane adjusted her skirt with an air of complacent pride. Paradine uncoiled himself and poured fresh Martinis. "Candidly, I don't see the point of teaching those apes philosophy. They're all at the wrong age. Their habit-patterns, their methods of thinking, are already laid down. They're horribly conservative, not that they'd admit it. The only people who can understand philosophy are mature adults or kids like Emma and Scotty."

"Well, don't enroll Scotty in your course," Jane requested. "He isn't ready to be a *Philosophiae Doctor*. I hold no brief for child geniuses, especially when it's my son."

"Scotty would probably be better at it than Betty Dawson," Paradine grunted.

" 'He died an enfeebled old dotard at five,' " Jane quoted dreamily. "I want your olive."

"Here. By the way, I like the shoes."

"Thank you. Here's Rosalie. Dinner?"

"It's all ready, Miz Pa'dine," said Rosalie, hovering. "I'll call Miss Emma 'n' Mista' Scotty."

"I'll get 'em." Paradine put his head into the next room and roared, "Kids! Come and get it!"

Small feet scuttered down the stairs. Scott dashed into view, scrubbed and shining, a rebellious cowlick aimed at the zenith. Emma pursued, levering herself carefully down the steps. Halfway she gave up the attempt to descend upright and reversed, finishing the task monkey-fashion, her small behind giving an impression of marvelous diligence upon the work in hand. Paradine watched, fascinated by the spectacle, till he was hurled back by the impact of his son's body.

"Hi, dad!" Scott shrieked.

Paradine recovered himself and regarded Scott with dignity. "Hi, yourself. Help me in to dinner. You've dislocated at least one of my hip joints."

But Scott was already tearing into the next room, where he stepped on Jane's new shoes in an ecstasy of affection, burbled an apology, and rushed off to find his place at the dinner table. Paradine cocked up an eyebrow as he followed, Emma's pudgy hand desperately gripping his forefinger.

"Wonder what the young devil's been up to?"

"No good, probably," Jane sighed. "Hello, darling. Let's see your ears."

"They're *clean*. Mickey licked 'em."

"Well, that Airedale's tongue is far cleaner than your ears," Jane pondered, making a brief examination. "Still, as long as you can hear, the dirt's only superficial."

"Fisshul?"

"Just a little, that means." Jane dragged

her daughter to the table and inserted her legs into a high chair. Only lately had Emma graduated to the dignity of dining with the rest of the family, and she was, as Paradine remarked, all eat up with pride by the prospect. Only babies spilled food, Emma had been told. As a result, she took such painstaking care in conveying her spoon to her mouth that Paradine got the jitters whenever he watched.

"A conveyer belt would be the thing for Emma," he suggested, pulling out a chair for Jane. "Small buckets of spinach arriving at her face at stated intervals."

Dinner proceeded uneventfully until Paradine happened to glance at Scott's plate. "Hello, there. Sick? Been stuffing yourself at lunch?"

Scott thoughtfully examined the food still left before him. "I've had all I need, dad," he explained.

"You usually eat all you can hold, and a great deal more," Paradine said. "I know growing boys need several tons of foodstuff a day, but you're below par tonight. Feel O. K.?"

"Uh-huh. Honest, I've had all I need."

"All you *want?*"

"Sure. I eat different."

"Something they taught you at school?" Jane inquired.

Scott shook his head solemnly.

"Nobody taught me. I found it out myself. I use spit."

"Try again," Paradine suggested. "It's the wrong word."

"Uh . . . s-saliva. Hm-m-m?"

"Uh-huh. More pepsin? Is there pepsin in the salivary juices, Jane? I forget."

"There's poison in mine," Jane remarked. "Rosalie's left lumps in the mashed potatoes again."

But Paradine was interested. "You mean you're getting everything possible out of your food—no wastage—and eating less?"

Scott thought that over. "I guess so. It's not just the sp . . . saliva. I sort of measure how much to put in my mouth at once, and what stuff to mix up. I dunno. I just do it."

"Hm-m-m," said Paradine, making a note to check up later. "Rather a revolutionary idea." Kids often get screwy notions, but this one might not be so far off the beam. He pursed his lips. "Eventually I suppose people will eat quite differently—I mean the *way* they eat, as well as what. What they eat, I mean. Jane, our son shows signs of becoming a genius."

"Oh?"

"It's a rather good point in dietetics he just made. Did you figure it out yourself, Scott?"

"Sure," the boy said, and really believed it.

"Where'd you get the idea?"

"Oh, I—" Scott wriggled. "I dunno. It doesn't mean much, I guess."

Paradine was unreasonably disappointed. "But surely—"

"S-s-s-spit!" Emma shrieked, overcome by a sudden fit of badness. *"Spit!"* She attempted to demonstrate, but succeeded only in dribbling into her bib.

With a resigned air Jane rescued and reproved her daughter, while Paradine eyed Scott with rather puzzled interest. But it was not till after dinner, in the living room, that anything further happened.

"Any homework?"

"N-no," Scott said, flushing guiltily. To cover his embarrassment he took from his pocket a gadget he had found in the box, and began to unfold it. The result resembled a tesseract, strung with beads. Paradine didn't see it at first, but Emma did. She wanted to play with it.

"No. Lay off, Slug," Scott ordered. "You can watch me." He fumbled with the beads, making soft, interested noises. Emma extended a fat forefinger and yelped.

"Scotty," Paradine said warningly.

"I didn't hurt her."

"Bit me. It did," Emma mourned.

Paradine looked up. He frowned, staring. What in—

"Is that an abacus?" he asked. "Let's see it, please."

Somewhat unwillingly Scott brought the gadget across to his father's chair. Paradine blinked. The "abacus," unfolded, was more than a foot square, composed of thin, rigid wires that interlocked here and there. On the wires the colored beads were strung. They could be slid back and forth, and from one support to another, even at the points of jointure. But—a pierced bead couldn't cross *interlocking* wires—

So, apparently, they weren't pierced. Paradine looked closer. Each small sphere had a deep groove running around it, so that it could

be revolved and slid along the wire at the same time. Paradine tried to pull one free. It clung as though magnetically. Iron? It looked more like plastic.

The framework itself— Paradine wasn't a mathematician. But the angles formed by the wires were vaguely shocking, in their ridiculous lack of Euclidean logic. They were a maze. Perhaps that's what the gadget was—a puzzle.

"Where'd you get this?"

"Uncle Harry gave it to me," Scott said on the spur of the moment. "Last Sunday, when he came over." Uncle Harry was out of town, a circumstance Scott well knew. At the age of seven, a boy soon learns that the vagaries of adults follow a certain definite pattern, and that they are fussy about the donors of gifts. Moreover, Uncle Harry would not return for several weeks; the expiration of that period was unimaginable to Scott, or, at least, the fact that his lie would ultimately be discovered meant less to him than the advantages of being allowed to keep the toy.

Paradine found himself growing slightly confused as he attempted to manipulate the beads. The angles were vaguely illogical. It was like a puzzle. This red bead, if slid along *this* wire to *that* junction, should reach *there*—but it didn't. A maze, odd, but no doubt instructive. Paradine had a well-founded feeling that he'd have no patience with the thing himself.

Scott did, however, retiring to a corner and sliding beads around with much fumbling and grunting. The beads *did* sting, when Scott chose the wrong ones or tried to slide them in the wrong direction. At last he crowed exultantly.

"I did it, dad!"

"Eh? What? Let's see." The device looked exactly the same to Paradine, but Scott pointed and beamed.

"I made it disappear."

"It's still there?"

"That blue bead. It's gone now."

Paradine didn't believe that, so he merely snorted. Scott puzzled over the framework again. He experimented. This time there were no shocks, even slight. The abacus had showed him the correct method. Now it was up to him to do it on his own. The bizarre angles of the wires seemed a little less confusing now, somehow.

It was a most instructive toy—

It worked, Scott thought, rather like the crystal cube. Reminded of that gadget, he took it from his pocket and relinquished the abacus to Emma, who was struck dumb with joy. She fell to work sliding the beads, this time without protesting against the shocks—which, indeed, were very minor—and, being imitative, she managed to make a bead disappear almost as quickly as had Scott. The blue bead reappeared—but Scott didn't notice. He had forethoughtfully retired into an angle of the chesterfield and an overstuffed chair and amused himself with the cube.

There were little people inside the thing, tiny manikins much enlarged by the magnifying properties of the crystal, and they moved, all right. They built a house. It caught fire, with realistic-seeming flames, and stood by waiting. Scott puffed urgently. "Put it *out!*"

But nothing happened. Where was that queer fire engine, with revolving arms, that had appeared before? Here it was. It came sailing into the picture and stopped. Scott urged it on.

This was fun. Like putting on a play, only more real. The little people did what Scott told them, inside of his head. If he made a mistake, they waited till he'd found the right way. They even posed new problems for him—

The cube, too, was a most instructive toy. It was teaching Scott, with alarming rapidity—and teaching him very entertainingly. But it gave him no really new knowledge as yet. He wasn't ready. Later—later—

Emma grew tired of the abacus and went in search of Scott. She couldn't find him, even in his room, but once there the contents of the closet intrigued her. She discovered the box. It contained treasure-trove—a doll, which Scott had already noticed but discarded with a sneer. Squealing, Emma brought the doll downstairs, squatted in the middle of the floor, and began to take it apart.

"Darling! What's that?"

"Mr. Bear!"

Obviously it wasn't Mr. Bear, who was blind, earless, but comforting in his soft fatness. But all dolls were named Mr. Bear to Emma.

Jane Paradine hesitated. "Did you take that from some other little girl?"

"I didn't. She's mine."

Scott came out from his hiding place, thrust-

ing the cube into his pocket. "Uh—that's from Uncle Harry."

"Did Uncle Harry give that to you, Emma?"

"He gave it to me for Emma," Scott put in hastily, adding another stone to his foundation of deceit. "Last Sunday."

"You'll break it, dear."

Emma brought the doll to her mother. "She comes apart. See?"

"Oh? It . . . *ugh!*" Jane sucked in her breath. Paradine looked up quickly.

"What's up?"

She brought the doll over to him, hesitated, and then went into the dining room, giving Paradine a significant glance. He followed, closing the door. Jane had already placed the doll on the cleared table.

"This isn't very nice, is it, Denny?"

"Hm-m-m." It was rather unpleasant, at first glance. One might have expected an anatomical dummy in a medical school, but a child's doll—

The thing came apart in sections, skin, muscles, organs, miniature but quite perfect, as far as Paradine could see. He was interested. "Dunno. Such things haven't the same connotations to a kid—"

"Look at that liver. Is it a liver?"

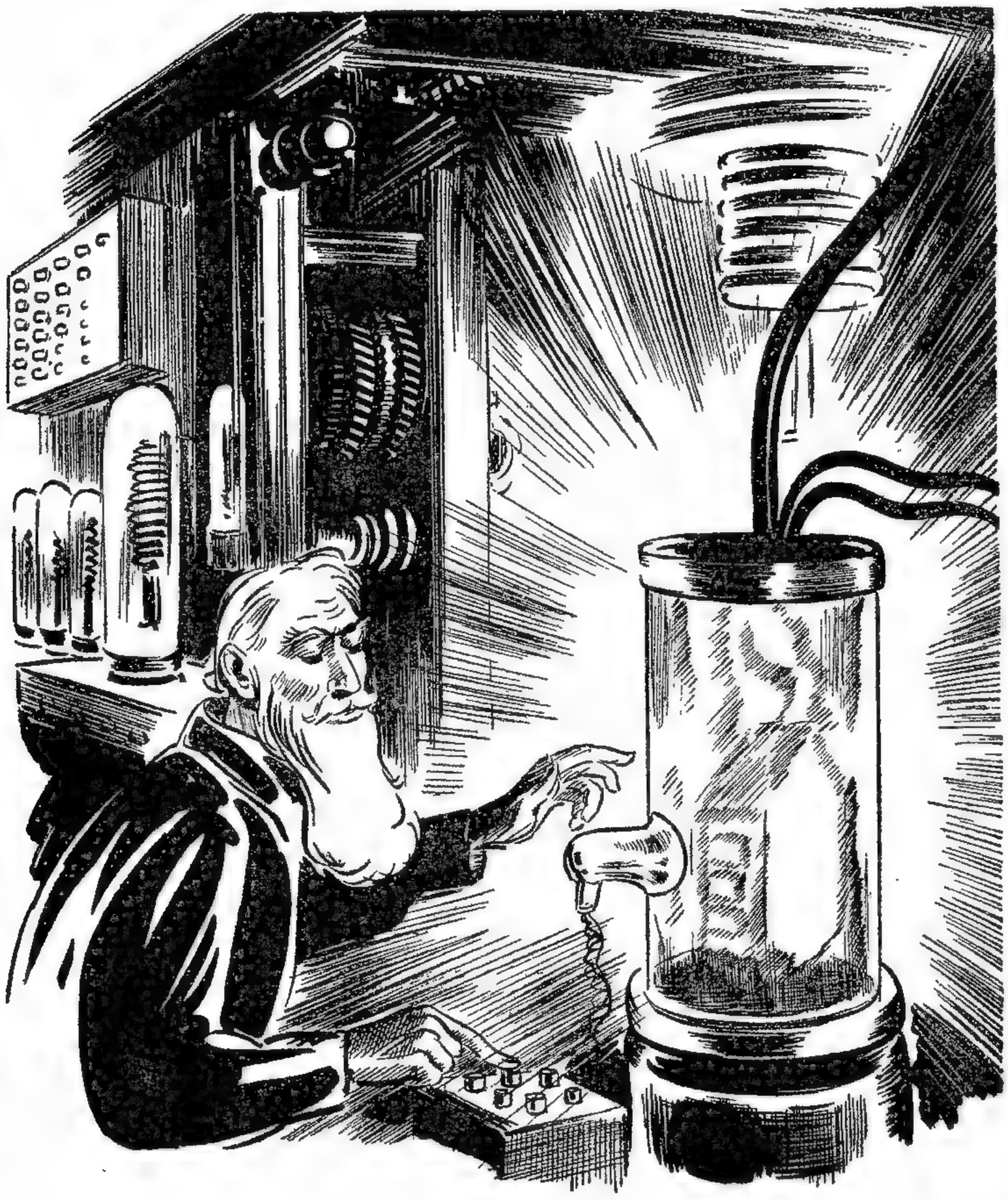
"Sure. Say, I . . . this is funny."

"What?"

"It isn't anatomically perfect, after all." Paradine pulled up a chair. "The digestive tract's too short. No large intestine. No appendix, either."

"Should Emma have a thing like this?"

"I wouldn't mind having it myself," Para-



dine said. "Where on earth did Harry pick it up? No, I don't see any harm in it. Adults are conditioned to react unpleasantly to innards. Kids don't. They figure they're solid inside, like a potato. Emma can get a sound working knowledge of physiology from this doll."

"But what are those? Nerves?"

"No, these are the nerves. Arteries here; veins here. Funny sort of aorta—" Paradine looked baffled. "That . . . what's Latin for network? Anyway . . . huh? *Rita? Rata?*"

"*Rales,*" Jane suggested at random.

"That's a sort of breathing," Paradine said crushingly. "I can't figure out what this luminous network of stuff is. It goes all through the body, like nerves."

"Blood."

"Nope. Not circulatory, not neural—funny! It seems to be hooked up with the lungs."

They became engrossed, puzzling over the strange doll. It was made with remarkable perfection of detail, and that in itself was strange, in view of the physiological variation from the norm. "Wait'll I get that Gould," Paradine said, and presently was comparing the doll with anatomical charts. He learned little, except to increase his bafflement.

But it was more fun than a jigsaw puzzle.

Meanwhile, in the adjoining room, Emma was sliding the beads to and fro in the abacus. The motions didn't seem so strange now. Even when the beads vanished. She could almost follow that new direction—almost—

Scott panted, staring into the crystal cube and mentally directing, with many false starts, the building of a structure somewhat more complicated than the one which had been destroyed by fire. He, too, was learning—being conditioned—

Paradine's mistake, from a completely anthropomorphic standpoint, was that he didn't get rid of the toys instantly. He did not realize their significance, and, by the time he did, the progression of circumstances had got well under way. Uncle Harry remained out of town, so Paradine couldn't check with him. Too, the midterm exams were on, which meant arduous mental effort and complete exhaustion at night; and Jane was slightly ill for a week or so. Emma and Scott had free rein with the toys.

"What," Scott asked his father one evening, "is a wabe, dad?"

"Wave?"

He hesitated. "I . . . don't *think* so. Isn't wabe right?"

"Wab is Scot for web. That it?"

"I don't see how," Scott muttered, and wandered off, scowling, to amuse himself with the abacus. He was able to handle it quite deftly now. But, with the instinct of children for avoiding interruptions, he and Emma usually played with the toys in private. Not obviously, of course—but the more intricate experiments were never performed under the eye of an adult.

Scott was learning fast. What he now saw in the crystal cube had little relationship to the original simple problems. But they were fascinatingly technical. Had Scott realized that his education was being guided and supervised—though merely mechanically—he would probably have lost interest. As it was, his initiative was never quashed.

Abacus, cube, doll—and other toys the children found in the box—

Neither Paradine nor Jane guessed how much of an effect the contents of the time machine were having on the kids. How could they? Youngsters are instinctive dramatists, for purposes of self-protection. They have not yet fitted themselves to the exigencies—to them partially inexplicable—of a mature world. Moreover, their lives are complicated by human variables. They are told by one person that playing in the mud is permissible, but that, in their excavations, they must not uproot flowers or small trees. Another adult vetoes mud *per se*. The Ten Commandments are not carved on stone; they vary, and children are helplessly dependent on the caprice of those who give them birth and feed and clothe them. And tyrannize. The young animal does not resent that benevolent tyranny, for it is an essential part of nature. He is, however, an individualist, and maintains his integrity by a subtle, passive fight.

Under the eyes of an adult he changes. Like an actor on-stage, when he remembers, he strives to please, and also to attract attention to himself. Such attempts are not unknown to maturity. But adults are less obvious—to other adults.

It is difficult to admit that children lack subtlety. Children are different from the mature animal because they think in another way. We can more or less easily pierce the pretenses they set up—but they can do the same to us. Ruthlessly a child can destroy the

pretenses of an adult. Iconoclasm is their prerogative.

Foppishness, for example. The amenities of social intercourse, exaggerated not quite to absurdity. The gigolo—

"Such *savoir faire!* Such punctilious courtesy!" The dowager and the blond young thing are often impressed. Men have less pleasant comments to make. But the child goes to the root of the matter.

"You're *silly!*"

How can an immature human understand the complicated system of social relationships? He can't. To him, an exaggeration of natural courtesy is silly. In his functional structure of life-patterns, it is rococo. He is an egotistic little animal, who cannot visualize himself in the position of another—certainly not an adult. A self-contained, almost perfect natural unit, his wants supplied by others, the child is much like a unicellular creature floating in the blood stream, nutriment carried to him, waste products carried away—

From the standpoint of logic, a child is rather horribly perfect. A baby may be even more perfect, but so alien to an adult that only superficial standards of comparison apply. The thought processes of an infant are completely unimaginable. But babies think, even before birth. In the womb they move and sleep, not entirely through instinct. We are conditioned to react rather peculiarly to the idea that a nearly-viable embryo may think. We are surprised, shocked into laughter, and repelled. Nothing human is alien.

But a baby is not human. An embryo is far less human.

That, perhaps, was why Emma learned more from the toys than did Scott. He could communicate his thoughts, of course; Emma could not, except in cryptic fragments. The matter of the scrawls, for example—

Give a young child pencil and paper, and he will draw something which looks different to him than to an adult. The absurd scribbles have little resemblance to a fire engine, but it *is* a fire engine, to a baby. Perhaps it is even three-dimensional. Babies think differently and see differently.

Paradine brooded over that, reading his paper one evening and watching Emma and Scott communicate. Scott was questioning his sister. Sometimes he did it in English. More often he had resource to gibberish and sign language. Emma tried to reply, but the handicap was too great.

Finally Scott got pencil and paper. Emma liked that. Tongue in cheek, she laboriously wrote a message. Scott took the paper, examined it, and scowled.

"That isn't right, Emma," he said.

Emma nodded vigorously. She seized the pencil again and made more scrawls. Scott puzzled for a while, finally smiled rather hesitantly, and got up. He vanished into the hall. Emma returned to the abacus.

Paradine rose and glanced down at the paper, with some mad thought that Emma might abruptly have mastered calligraphy. But she hadn't. The paper was covered with meaningless scrawls, of a type familiar to any parent. Paradine pursed his lips.

It might be a graph showing the mental variations of a manic-depressive cockroach, but probably wasn't. Still, it no doubt had meaning to Emma. Perhaps the scribble represented Mr. Bear.

Scott returned, looking pleased. He met Emma's gaze and nodded. Paradine felt a twinge of curiosity.

"Secrets?"

"Nope. Emma . . . uh . . . asked me to do something for her."

"Oh." Paradine, recalling instances of babies who had babbled in unknown tongues and baffled linguists, made a note to pocket the paper when the kids had finished with it. The next day he showed the scrawl to Elkins at the university. Elkins had a sound working knowledge of many unlikely languages, but he chuckled over Emma's venture into literature.

"Here's a free translation, Dennis. Quote. I don't know what this means, but I kid the hell out of my father with it. Unquote."

The two men laughed and went off to their classes. But later Paradine was to remember the incident. Especially after he met Holloway. Before that, however, months were to pass, and the situation to develop even further toward its climax.

Perhaps Paradine and Jane had evinced too much interest in the toys. Emma and Scott took to keeping them hidden, playing with them only in private. They never did it overtly, but with a certain unobtrusive caution. Nevertheless, Jane especially was somewhat troubled.

She spoke to Paradine about it one evening.

"That doll Harry gave Emma."

"Yeah?"

"I was downtown today and tried to find out where it came from. No soap."

"Maybe Harry bought it in New York."

Jane was unconvinced. "I asked them about the other things, too. They showed me their stock—Johnson's a big store, you know. But there's nothing like Emma's abacus."

"Hm-m-m." Paradine wasn't much interested. They had tickets for a show that night, and it was getting late. So the subject was dropped for the nonce.

Later it cropped up again, when a neighbor telephoned Jane.

"Scotty's never been like that, Denny. Mrs. Burns said he frightened the devil out of her Francis."

"Francis? A little fat bully of a punk, isn't he? Like his father. I broke Burns' nose for him once, when we were sophomores."

"Stop boasting and listen," Jane said, mixing a highball. "Scott showed Francis something that scared him. Hadn't you better—"

"I suppose so." Paradine listened. Noises in the next room told him the whereabouts of his son. "Scotty!"

"Bang," Scott said, and appeared smiling. "I killed 'em all. Space pirates. You want me, dad?"

"Yes. If you don't mind leaving the space pirates unburied for a few minutes. What did you do to Francis Burns?"

Scott's blue eyes reflected incredible candor. "Huh?"

"Try hard. You can remember, I'm sure."

"Uh. Oh, that. I didn't do nothing."

"Anything," Jane corrected absently.

"Anything. Honest. I just let him look into my television set, and it . . . it scared him."

"Television set?"

Scott produced the crystal cube. "It isn't really that. See?"

Paradine examined the gadget, startled by the magnification. All he could see, though, was a maze of meaningless colored designs.

"Uncle Harry—"

Paradine reached for the telephone. Scott gulped. "Is . . . is Uncle Harry back in town?"

"Yeah."

"Well, I gotta take a bath." Scott headed for the door. Paradine met Jane's gaze and nodded significantly.

Harry was home, but disclaimed all knowledge of the peculiar toys. Rather grimly, Paradine requested Scott to bring down from his room all of the playthings. Finally they lay in a row on the table, cube, abacus, doll, helmetlike cap, several other mysterious contraptions. Scott was cross-examined. He lied valiantly for a time, but broke down at last and bawled, hiccuping his confession.

"Get the box these things came in," Paradine ordered. "Then head for bed."

"Are you . . . *hup!* . . . gonna punish me, daddy?"

"For playing hooky and lying, yes. You know the rules. No more shows for two weeks. No sodas for the same period."

Scott gulped. "You gonna keep my things?"

"I don't know yet."

"Well . . . g'night, daddy. G'night, mom."

After the small figure had gone upstairs, Paradine dragged a chair to the table and carefully scrutinized the box. He poked thoughtfully at the fused gadgetry. Jane watched.

"What is it, Denny?"

"Dunno. Who'd leave a box of toys down by the creek?"

"It might have fallen out of a car."

"Not at that point. The road doesn't hit the creek north of the railroad trestle. Empty lots—nothing else." Paradine lit a cigarette. "Drink, honey?"

"I'll fix it." Jane went to work, her eyes troubled. She brought Paradine a glass and stood behind him, ruffling his hair with her fingers. "Is anything wrong?"

"Of course not. Only—where did these toys come from?"

"Johnson's didn't know, and they get their stock from New York."

"I've been checking up, too," Paradine admitted. "That doll"—he poked it—"rather worried me. Custom jobs, maybe, but I wish I knew who'd made 'em."

"A psychologist? That abacus—don't they give people tests with such things?"

Paradine snapped his fingers. "Right! And say! There's a guy going to speak at the university next week, fellow named Holloway, who's a child psychologist. He's a big shot, with quite a reputation. He might know something about it."

"Holloway? I don't—"

"Rex Holloway. He's . . . hm-m-m! He doesn't live far from here. Do you suppose he might have had these things made himself?"

Jane was examining the abacus. She grim-

aced and drew back. "If he did, I don't like him. But see if you can find out, Denny."

Paradine nodded. "I shall."

He drank his highball, frowning. He was vaguely worried. But he wasn't scared—yet.

Rex Holloway was a fat, shiny man, with a bald head and thick spectacles, above which his thick, black brows lay like bushy caterpillars. Paradine brought him home to dinner one night a week later. Holloway did not appear to watch the children, but nothing they did or said was lost on him. His gray eyes, shrewd and bright, missed little.

The toys fascinated him. In the living room the three adults gathered around the table, where the playthings had been placed. Holloway studied them carefully as he listened to what Jane and Paradine had to say. At last he broke his silence.

"I'm glad I came here tonight. But not completely. This is very disturbing, you know."

"Eh?" Paradine stared, and Jane's face showed her consternation. Holloway's next words did not calm them.

"We are dealing with madness."

He smiled at the shocked looks they gave him. "All children are mad, from an adult viewpoint. Ever read Hughes' 'High Wind in Jamaica'?"

"I've got it." Paradine secured the little book from its shelf. Holloway extended a hand, took it, and flipped the pages till he had found the place he wanted. He read aloud:

" 'Babies of course are not human—they are animals, and have a very ancient and ramified culture, as cats have, and fishes, and even snakes; the same in kind as these, but much more complicated and vivid, since babies are, after all, one of the most developed species of the lower vertebrates. In short, babies have minds which work in terms and categories of their own which cannot be translated into the terms and categories of the human mind.' "

Jane tried to take that calmly, but couldn't. "You don't mean that Emma—"

"Could you think like your daughter?" Holloway asked. "Listen: 'One can no more think like a baby than one can think like a bee.' "

Paradine mixed drinks. Over his shoulder he said, "You're theorizing quite a bit, aren't you? As I get it, you're implying that babies have a culture of their own, even a high standard of intelligence."

"Not necessarily. There's no yardstick, you see. All I say is that babies think in other ways than we do. Not necessarily *better*—that's a question of relative values. But with a different manner of extension—" He sought for words, grimacing.

"Fantasy," Paradine said, rather rudely, but annoyed because of Emma. "Babies don't have different senses from ours."

"Who said they did?" Holloway demanded. "They use their minds in a different way, that's all. But it's quite enough!"

"I'm trying to understand," Jane said slowly. "All I can think of is my Mixmaster. It can whip up batter and potatoes, but it can squeeze oranges, too."

"Something like that. The brain's a colloid, a very complicated machine. We don't know much about its potentialities. We don't even know how much it can grasp. But it *is* known that the mind becomes conditioned as the human animal matures. It follows certain familiar theorems, and all thought thereafter is pretty well based on patterns taken for granted. Look at this." Holloway touched the abacus. "Have you experimented with it?"

"A little," Paradine said.

"But not much. Eh?"

"Well—"

"Why not?"

"It's pointless," Paradine complained. "Even a puzzle has to have some logic. But those crazy angles—"

"Your mind has been conditioned to Euclid," Holloway said. "So this—thing—bores us, and seems pointless. But a child knows nothing of Euclid. A different sort of geometry from ours wouldn't impress him as being i'logical. He believes what he sees."

"Are you trying to tell me that this gadget's got a fourth-dimensional extension?" Paradine demanded.

"Not visually, anyway," Holloway denied. "All I say is that our minds, conditioned to Euclid, can see nothing in this but an illogical tangle of wires. But a child—especially a baby—might see more. Not at first. It'd be a puzzle, of course. Only a child wouldn't be handicapped by too many preconceived ideas."

"Hardening of the thought-arteries," Jane interjected.

Paradine was not convinced. "Then a baby could work calculus better than Einstein? No,

I don't mean that. I can see your point, more or less clearly. Only—"

"Well, look. Let's suppose there are two kinds of geometry—we'll limit it, for the sake of the example. Our kind, Euclidean, and another, which we'll call x. X hasn't much relationship to Euclid. It's based on different theorems. Two and two needn't equal four in it; they could equal y^2, or they might not even *equal*. A baby's mind is not yet conditioned, except by certain questionable factors of heredity and environment. Start the infant on Euclid—"

"Poor kid," Jane said.

Holloway shot her a quick glance. "The basis of Euclid. Alphabet blocks. Math, geometry, algebra—they come much later. We're familiar with that development. On the other hand, start the baby with the basic principles of our x logic."

"Blocks? What kind?"

Holloway looked at the abacus. "It wouldn't make much sense to us. But we've been conditioned to Euclid."

Paradine poured himself a stiff shot of whiskey. "That's pretty awful. You're not limiting to math."

"Right! I'm not limiting it at all. How can I? I'm not conditioned to x logic."

"There's the answer," Jane said, with a sigh of relief. "Who is? It'd take such a person to make the sort of toys you apparently think these are."

Holloway nodded, his eyes, behind the thick lenses, blinking. "Such people may exist."

"Where?"

"They might prefer to keep hidden."

"Supermen?"

"I wish I knew. You see, Paradine, we've got yardstick trouble again. By our standards these people might seem super-doopers in certain respects. In others they might seem moronic. It's not a quantitative difference; it's qualitative. They *think* different. And I'm sure we can do things they can't."

"Maybe they wouldn't want to," Jane said.

Paradine tapped the fused gadgetry on the box. "What about this? It implies—"

"A purpose, sure."

"Transportation?"

"One thinks of that first. If so, the box might have come from anywhere."

"Where—things are—*different?*" Paradine asked slowly.

"Exactly. In space, or even time. I don't know; I'm a psychologist. Unfortunately I'm conditioned to Euclid, too."

"Funny place it must be," Jane said. "Denny, get rid of those toys."

"I intend to."

Holloway picked up the crystal cube. "Did you question the children much?"

Paradine said, "Yeah. Scott said there were people in that cube when he first looked. I asked him what was in it now."

"What did he say?" The psychologist's eyes widened.

"He said they were building a place. His exact words. I asked him who—people? But he couldn't explain."

"No, I suppose not," Holloway muttered. "It must be progressive. How long have the children had these toys?"

"About three months, I guess."

"Time enough. The perfect toy, you see, is both instructive and mechanical. It should do things, to interest a child, and it should teach, preferably unobtrusively. Simple problems at first. Later—"

"*X* logic," Jane said, white-faced.

Paradine cursed under his breath. "Emma and Scott are perfectly normal!"

"Do you know how their minds work—now?"

Holloway didn't pursue the thought. He fingered the doll. "It would be interesting to know the conditions of the place where these things came from. Induction doesn't help a great deal, though. Too many factors are missing. We can't visualize a world based on the x factor—environment adjusted to minds thinking in x patterns. This luminous network inside the doll. It could be anything. It could exist inside us, though we haven't discovered it yet. When we find the right stain—" He shrugged. "What do you make of this?"

It was a crimson globe, two inches in diameter, with a protruding knob upon its surface.

"What could anyone make of it?"

"Scott? Emma?"

"I hadn't even seen it till about three weeks ago. Then Emma started to play with it." Paradine nibbled his lip. "After that, Scott got interested."

"Just what do they do?"

"Hold it up in front of them and move it back and forth. No particular pattern of motion."

"No Euclidean pattern," Holloway corrected. "At first they couldn't understand the

toy's purpose. They had to be educated up to it."

"That's horrible," Jane said.

"Not to them. Emma is probably quicker at understanding x than is Scott, for her mind isn't yet conditioned to this environment."

Paradine said, "But I can remember plenty of things I did as a child. Even as a baby."

"Well?"

"Was I—mad—then?"

"The things you don't remember are the criterion of your madness," Holloway retorted. "But I use the word 'madness' purely as a convenient symbol for the variation from the known human norm. The arbitrary standard of sanity."

Jane put down her glass. "You've said that induction was difficult, Mr. Holloway. But it seems to me you're making a great deal of it from very little. After all, these toys—"

"I *am* a psychologist, and I've specialized in children. I'm not a layman. These toys mean a great deal to me, chiefly because they mean so little."

"You might be wrong."

"Well, I rather hope I am. I'd like to examine the children."

Jane rose in arms. "How?"

After Holloway had explained, she nodded, though still a bit hesitantly. "Well, that's all right. But they're not guinea pigs."

The psychologist patted the air with a plump hand. "My dear girl! I'm not a Frankenstein. To me the individual is the prime factor—naturally, since I work with minds. If there's anything wrong with the youngsters, I want to cure them."

Paradine put down his cigarette and slowly watched blue smoke spiral up, wavering in an unfelt draft. "Can you give a prognosis?"

"I'll try. That's all I can say. If the undeveloped minds have been turned into the x channel, it's necessary to divert them back. I'm not saying that's the wisest thing to do, but it probably is from our standards. After all, Emma and Scott will have to live in this world."

"Yeah. Yeah. I can't believe there's much wrong. They seem about average, thoroughly normal."

"Superficially they may seem so. They've no reason for acting abnormally, have they? And how can you tell if they—think differently?"

"I'll call 'em," Paradine said.

"Make it informal, then. I don't want them to be on guard."

Jane nodded toward the toys. Holloway said, "Leave the stuff there, eh?"

But the psychologist, after Emma and Scott were summoned, made no immediate move at direct questioning. He managed to draw Scott unobtrusively into the conversation, dropping key words now and then. Nothing so obvious as a word-association test—co-operation is necessary for that.

The most interesting development occurred when Holloway took up the abacus. "Mind showing me how this works?"

Scott hesitated. "Yes, sir. Like this—" He slid a bead deftly through the maze, in a tangled course, so swiftly that no one was quite sure whether or not it ultimately vanished. It might have been merely legerdemain. Then, again—

Holloway tried. Scott watched, wrinkling his nose.

"That right?"

"Uh-huh. It's gotta go *there*—"

"Here? Why?"

"Well, that's the only way to make it work."

But Holloway was conditioned to Euclid. There was no apparent reason why the bead should slide from this particular wire to the other. It looked like a random factor. Also, Holloway suddenly noticed, this wasn't the path the bead had taken previously, when Scott had worked the puzzle. At least, as well as he could tell.

"Will you show me again?"

Scott did, and twice more, on request. Holloway blinked through his glasses. Random, yes. And a variable. Scott moved the bead along a different course each time.

Somehow, none of the adults could tell whether or not the bead vanished. If they had expected to see it disappear, their reactions might have been different.

In the end nothing was solved. Holloway, as he said good night, seemed ill at ease.

"May I come again?"

"I wish you would," Jane told him. "Any time. You still think—"

He nodded. "The children's minds are not reacting normally. They're not dull at all, but I've the most extraordinary impression that they arrive at conclusions in a way we don't understand. As though they used algebra while we used geometry. The same conclusion, but a different method of reaching it."

"What about the toys?" Paradine asked suddenly.

"Keep them out of the way. I'd like to borrow them, if I may—"

That night Paradine slept badly. Holloway's parallel had been ill-chosen. It led to disturbing theories. The *x* factor— The children were using the equivalent of algebraic reasoning, while adults used geometry.

Fair enough. Only—

Algebra can give you answers that geometry cannot, since there are certain terms and symbols which cannot be expressed geometrically. Suppose *x* logic showed conclusions inconceivable to an adult mind?

"Damn!" Paradine whispered. Jane stirred beside him.

"Dear? Can't you sleep either?"

"No." He got up and went into the next room. Emma slept peacefully as a cherub, her fat arm curled around Mr. Bear. Through the open doorway Paradine could see Scott's dark head motionless on the pillow.

Jane was beside him. He slipped his arm around her.

"Poor little people," she murmured. "And Holloway called them mad. I think we're the ones who are crazy, Dennis."

"Uh-huh. We've got jitters."

Scott stirred in his sleep. Without awakening, he called what was obviously a question, though it did not seem to be in any particular language. Emma gave a little mewling cry that changed pitch sharply.

She had not wakened. The children lay without stirring.

But, Paradine thought, with a sudden sickness in his middle, it was exactly as though Scott had asked Emma something, and she had replied.

Had their minds changed so that even—sleep—was different to them?

He thrust the thought away. "You'll catch cold. Let's get back to bed. Want a drink?"

"I think I do," Jane said, watching Emma. Her hand reached out blindly toward the child; she drew it back. "Come on. We'll wake the kids."

They drank a little brandy together, but said nothing. Jane cried in her sleep, later.

Scott was not awake, but his mind worked in slow, careful building. Thus—

"They'll take the toys away. The fat man . . . listava dangerous maybe. But the Ghoric direction won't show . . . evankrus dun-hasn't-them. Intransdection . . . bright and shiny. Emma. She's more khopranik-high now than . . . I still don't see how to . . . thavarar lixery dist—"

A little of Scott's thoughts could still be understood. But Emma had become conditioned to *x* much faster.

She was thinking, too.

Not like an adult or a child. Not even like a human. Except, perhaps, a human of a type shockingly unfamiliar to *genus homo*.

Sometimes Scott himself had difficulty in following her thoughts.

If it had not been for Holloway, life might have settled back into an almost normal routine. The toys were no longer active reminders. Emma still enjoyed her dolls and sand pile, with a thoroughly explicable delight. Scott was satisfied with baseball and his chemical set. They did everything other children did, and evinced few, if any, flashes of abnormality. But Holloway seemed to be an alarmist.

He was having the toys tested, with rather idiotic results. He drew endless charts and diagrams, corresponded with mathematicians, engineers, and other psychologists, and went quietly crazy trying to find rhyme or reason in the construction of the gadgets. The box itself, with its cryptic machinery, told nothing. Fusing had melted too much of the stuff into slag. But the toys—

It was the random element that baffled investigation. Even that was a matter of semantics. For Holloway was convinced that it wasn't really random. There just weren't enough known factors. No adult could work the abacus, for example. And Holloway thoughtfully refrained from letting a child play with the thing.

The crystal cube was similarly cryptic. It showed a mad pattern of colors, which sometimes moved. In this it resembled a kaleidoscope. But the shifting of balance and gravity didn't affect it. Again the random factor.

Or, rather, the unknown. The *x* pattern. Eventually Paradine and Jane slipped back into something like complacence, with a feeling that the children had been cured of their mental quirk, now that the contributing cause had been removed. Certain of the actions of Emma and Scott gave them every reason to quit worrying.

For the kids enjoyed swimming, hiking, movies, games, the normal functional toys of

this particular time-sector. It was true that they failed to master certain rather puzzling mechanical devices which involved some calculation. A three-dimensional jigsaw globe Paradine had picked up, for example. But he found that difficult himself.

Once in a while there were lapses. Scott was hiking with his father one Saturday afternoon, and the two had paused at the summit of a hill. Beneath them a rather lovely valley was spread.

"Pretty, isn't it?" Paradine remarked.

Scott examined the scene gravely. "It's all wrong," he said.

"Eh?"

"I dunno."

"What's wrong about it?"

"Gee—" Scott lapsed into puzzled silence. "I dunno."

The children had missed their toys, but not for long. Emma recovered first, though Scott still moped. He held unintelligible conversations with his sister, and studied meaningless scrawls she drew on paper he supplied. It was almost as though he was consulting her, anent difficult problems beyond his grasp.

If Emma understood more, Scott had more real intelligence, and manipulatory skill as well. He built a gadget with his Meccano set, but was dissatisfied. The apparent cause of his satisfaction was exactly why Paradine was relieved when he viewed the structure. It was the sort of thing a normal boy would make, vaguely reminiscent of a cubistic ship.

It was a bit too normal to please Scott. He asked Emma more questions, though in private. She thought for a time, and then made more scrawls with an awkwardly clutched pencil.

"Can you read that stuff?" Jane asked her son one morning.

"Not read it, exactly. I can tell what she means. Not all the time, but mostly."

"Is it writing?"

"N-no. It doesn't mean what it *looks* like."

"Symbolism," Paradine suggested over his coffee.

Jane looked at him, her eyes widening. "Denny—"

He winked and shook his head. Later, when they were alone, he said, "Don't let Holloway upset you. I'm not implying that the kids are corresponding in an unknown tongue. If Emma draws a squiggle and says it's a flower, that's an arbitrary rule—Scott remembers that. Next time she draws the same sort of squiggle, or tries to—well!"

"Sure," Jane said doubtfully. "Have you noticed Scott's been doing a lot of reading lately?"

"I noticed. Nothing unusual, though. No Kant or Spinoza."

"He browses, that's all."

"Well, so did I, at his age," Paradine said, and went off to his morning classes. He lunched with Holloway, which was becoming a daily habit, and spoke of Emma's literary endeavors.

"Was I right about symbolism, Rex?"

The psychologist nodded. "Quite right. Our own language is nothing but arbitrary symbolism now. At least in its application. Look here." On his napkin he drew a very narrow ellipse. "What's that?"

"You mean what does it represent?"

"Yes. What does it suggest to you? It could be a crude representation of—what?"

"Plenty of things," Paradine said. "Rim of a glass. A fried egg. A loaf of French bread. A cigar."

Holloway added a little triangle to his drawing, apex joined to one end of the ellipse. He looked up at Paradine.

"A fish," the latter said instantly.

"Our familiar symbol for a fish. Even without fins, eyes or mouth, it's recognizable, because we've been conditioned to identify this particular shape with our mental picture of a fish. The basis of a rebus. A symbol, to us, means a lot more than what we actually see on paper. What's in your mind when you look at this sketch?"

"Why—a fish."

"Keep going. What do you visualize—everything!"

"Scales," Paradine said slowly, looking into space. "Water. Foam. A fish's eye. The fins. The colors."

"So the symbol represents a lot more than just the abstract idea *fish*. Note the connotation's that of a noun, not a verb. It's harder to express actions by symbolism, you know. Anyway—reverse the process. Suppose you want to make a symbol for some concrete noun, say *bird*. Draw it."

Paradine drew two connected arcs, concavities down.

"The lowest common denominator," Holloway nodded. "The natural tendency is to simplify. Especially when a child is seeing something for the first time and has few standards

of comparison. He tries to identify the new thing with what's already familiar to him. Ever notice how a child draws the ocean?" He didn't wait for an answer; he went on.

"A series of jagged points. Like the oscillating line on a seismograph. When I first saw the Pacific, I was about three. I remember it pretty clearly. It looked—tilted. A flat plain, slanted at an angle. The waves were regular triangles, apex upward. Now I didn't *see* them stylized that way, but later, remembering, I had to find some familiar standard of comparison. Which is the only way of getting any conception of an entirely new thing. The average child tries to draw these regular triangles, but his co-ordination's poor. He gets a seismograph pattern."

"All of which means what?"

"A child sees the ocean. He stylizes it. He draws a certain definite pattern, symbolic, to him, of the sea. Emma's scrawls may be symbols, too. I don't mean that the world looks different to her—brighter, perhaps, and sharper, more vivid and with a slackening of perception above her eye level. What I do mean is that her thought-processes are different, that she translates what she sees into abnormal symbols."

"You still believe—"

"Yes, I do. Her mind has been conditioned unusually. It may be that she breaks down what she sees into simple, obvious patterns—and realizes a significance to those patterns that we can't understand. Like the abacus. She saw a pattern in that, though to us it was completely random."

Paradine abruptly decided to taper off these luncheon engagements with Holloway. The man was an alarmist. His theories were growing more fantastic than ever, and he dragged in anything, applicable or not, that would support them.

Rather sardonically he said, "Do you mean Emma's communicating with Scott in an unknown language?"

"In symbols for which she hasn't any words. I'm sure Scott understands a great deal of those—scrawls. To him, an isosceles triangle may represent any factor, though probably a concrete noun. Would a man who knew nothing of algebra understand what H_2O meant? Would he realize that the symbol could evoke a picture of the ocean?"

Paradine didn't answer. Instead, he mentioned to Holloway Scott's curious remark that the landscape, from the hill, had looked all wrong. A moment later, he was inclined to regret his impulse, for the psychologist was off again.

"Scott's thought-patterns are building up to a sum that doesn't equal this world. Perhaps he's subconsciously expecting to see the world where those toys came from."

Paradine stopped listening. Enough was enough. The kids were getting along all right, and the only remaining disturbing factor was Holloway himself. That night, however, Scott evinced an interest, later significant, in eels.

There was nothing apparently harmful in natural history. Paradine explained about eels.

"But where do they lay their eggs? Or do they?"

"That's still a mystery. Their spawning grounds are unknown. Maybe the Sargasso Sea, or the deeps, where the pressure can help them force the young out of their bodies."

"Funny," Scott said, thinking deeply.

"Salmon do the same thing, more or less. They go up rivers to spawn." Paradine went into detail. Scott was fascinated.

"But that's *right*, dad. They're born in the river, and when they learn how to swim, they go down to the sea. And they come back to lay their eggs, huh?"

"Right."

"Only they wouldn't *come* back," Scott pondered. "They'd just send their eggs—"

"It'd take a very long ovipositor," Paradine said, and vouchsafed some well-chosen remarks upon oviparity.

His son wasn't entirely satisfied. Flowers, he contended, sent their seeds long distances.

"They don't guide them. Not many find fertile soil."

"Flowers haven't got brains, though. Dad, why do people live *here?*"

"Glendale?"

"No—*here*. This whole place. It isn't all there is, I bet."

"Do you mean the other planets?"

Scott was hesitant. "This is only—part—of the big place. It's like the river where the salmon go. Why don't people go on down to the ocean when they grow up?"

Paradine realized that Scott was speaking figuratively. He felt a brief chill. The—ocean?

The young of the species are not conditioned to live in the completer world of their parents.

Having developed sufficiently, they enter that world. Later they breed. The fertilized eggs are buried in the sand, far up the river, where later they hatch.

And they learn. Instinct alone is fatally slow. Especially in the case of a specialized genus, unable to cope even with this world, unable to feed or drink or survive, unless someone has foresightedly provided for those needs.

The young, fed and tended, would survive. There would be incubators and robots. They would survive, but they would not know how to swim downstream, to the vaster world of the ocean.

So they must be taught. They must be trained and conditioned in many ways.

Painlessly, subtly, unobtrusively. Children love toys that do things—and if those toys teach at the same time—

In the latter half of the nineteenth century an Englishman sat on a grassy bank near a stream. A very small girl lay near him, staring up at the sky. She had discarded a curious toy with which she had been playing, and now was murmuring a wordless little song, to which the man listened with half an ear.

"What was that, my dear?" he asked at last.

"Just something I made up, Uncle Charles."

"Sing it again." He pulled out a notebook.

The girl obeyed.

"Does it mean anything?"

She nodded. "Oh, yes. Like the stories I tell you, you know."

"They're wonderful stories, dear."

"And you'll put them in a book some day?"

"Yes, but I must change them quite a lot, or no one would understand. But I don't think I'll change your little song."

"You mustn't. If you did, it wouldn't mean anything."

"I won't change that stanza, anyway," he promised. "Just what does it mean?"

"It's the way out, I think," the girl said doubtfully. "I'm not sure yet. My magic toys told me."

"I wish I knew what London shop sold those marvelous toys!"

"Mamma bought them for me. She's dead. Papa doesn't care."

She lied. She had found the toys in a box one day, as she played by the Thames. And they were indeed wonderful.

Her little song— Uncle Charles thought it didn't mean anything. (He wasn't her real uncle, she parenthesized. But he was nice.) The song meant a great deal. It was the way. Presently she would do what it said, and then—

But she was already too old. She never found the way.

Paradine had dropped Holloway. Jane had taken a dislike to him, naturally enough, since what she wanted most of all was to have her fears calmed. Since Scott and Emma acted normally now, Jane felt satisfied. It was partly wishful-thinking, to which Paradine could not entirely subscribe.

Scott kept bringing gadgets to Emma for her approval. Usually she'd shake her head. Sometimes she would look doubtful. Very occasionally she would signify agreement. Then there would be an hour of laborious, crazy scribbling on scraps of note paper, and Scott, after studying the notations, would arrange and rearrange his rocks, bits of machinery, candle ends, and assorted junk. Each day the maid cleaned them away, and each day Scott began again.

He condescended to explain a little to his puzzled father, who could see no rhyme or reason in the game.

"But why this pebble right here?"

"It's hard and round, dad. It *belongs* there."

"So is this one hard and round."

"Well, that's got vaseline on it. When you get that far, you can't *see* just a hard round thing."

"What comes next? This candle?"

Scott looked disgusted. "That's toward the end. The iron ring's next."

It was, Paradine thought, like a Scout trail through the woods, markers in a labyrinth. But here again was the random factor. Logic halted—familiar logic—at Scott's motives in arranging the junk as he did.

Paradine went out. Over his shoulder he saw Scott pull a crumpled piece of paper and a pencil from his pocket, and head for Emma, who was squatted in a corner thinking things over.

Well—

Jane was lunching with Uncle Harry, and, on this hot Sunday afternoon, there was little to do but read the papers. Paradine settled himself in the coolest place he could find, with a Collins, and lost himself in the comic strips.

An hour later a clatter of feet upstairs roused him from his doze. Scott's voice was crying exultantly, "This is it, Slug! Come on—"

Paradine stood up quickly, frowning. As he went into the hall the telephone began to ring. Jane had promised to call—

His hand was on the receiver when Emma's faint voice squealed with excitement. Paradine grimaced. What the devil was going on upstairs?

Scott shrieked, "Look out! This way!"

Paradine, his mouth working, his nerves ridiculously tense, forgot the phone and raced up the stairs. The door of Scott's room was open.

The children were vanishing.

They went in fragments, like thick smoke in a wind, or like movement in a distorting mirror. Hand in hand they went, in a direction Paradine could not understand, and as he blinked there on the threshold, they were gone.

"Emma!" he said, dry-throated. *"Scotty!"*

On the carpet lay a pattern of markers, pebbles, an iron ring—junk. A random pattern. A crumpled sheet of paper blew toward Paradine.

He picked it up automatically.

"Kids. Where are you? Don't hide—

"Emma! SCOTTY!"

Downstairs the telephone stopped its shrill, monotonous ringing. Paradine looked at the paper he held.

It was a leaf torn from a book. There were interlineations and marginal notes, in Emma's meaningless scrawl. A stanza of verse had been so underlined and scribbled over that it was almost illegible, but Paradine was thoroughly familiar with "Through the Looking Glass." His memory gave him the words—

'Twas brillig, and the slithy toves
Did gyre and gimbel in the wabe.
All mimsy were the borogoves,
And the mome raths outgrabe.

Idiotically he thought: Humpty Dumpty explained it. A wabe is the plot of grass around a sundial. A sundial. Time— It has something to do with time. A long time ago Scotty asked me what a wabe was. Symbolism.

'Twas brillig—

A perfect mathematical formula, giving all the conditions, in symbolism the children had finally understood. The junk on the floor. The toves had to be made slithy—vaseline?—and they had to be placed in a certain relationship, so that they'd gyre and gimbel.

Lunacy!

But it had not been lunacy to Emma and Scott. They thought differently. They used x logic. Those notes Emma had made on the page—she'd translated Carroll's words into symbols both she and Scott could understand.

The random factor had made sense to the children. They had fulfilled the conditions of the time-span equation. *And the nome raths outgrabe—*

Paradine made a rather ghastly little sound, deep in his throat. He looked at the crazy pattern on the carpet. If he could follow it, as the kids had done— But he couldn't. The pattern was senseless. The random factor defeated him. He was conditioned to Euclid.

Even if he went insane, he still couldn't do it. It would be the wrong kind of lunacy.

His mind had stopped working now. But in a moment the stasis of incredulous horror would pass— Paradine crumpled the page in his fingers. "Emma, Scotty," he called in a dead voice, as though he could expect no response.

Sunlight slanted through the open windows, brightening the golden pelt of Mr. Bear. Downstairs the ringing of the telephone began again.

THE END.

THE MAN IN THE MOON

By Henry Norton

THE queer little fellow had strange ideas. A harmless little man, who wanted light, and a workbench—that grew. He didn't quite seem to fit our busy civilization. Didn't fit Earth at all—

Illustrated by Kolliker

The time to put a stop to things is at the beginning. It's a lot easier, for instance, to pull up a sapling than to chop down a tree. It would have been easier to spank a certain paper hanger back in 1935, than it was to crush his great war machine in January of 1944.

As Dr. Raven looked back on the whole affair, he realized he should have said "No!" and stuck to it the day Sereda asked for a workbench. But hindsight is notably more accurate than foresight, and the heavens know the little man looked harmless. How well they know!

Raven remembered the first time the little Sereda ever came to Mount Palomar. He had walked all the way up the mountain, and sat down dusty and out of breath on the steps of the observatory. Raven felt sorry for him.

He couldn't have been more than five feet tall, and his pleasant, swarthy face was marked on the chin by a black, hairy mole. He was completely bald. Not just bald on top—there was no relieving fringe around his ears or neck. He was literally bald as an egg, and his face was round and smiling.

"The sun is good," he said simply to Raven.

"Good and hot," said Raven. A lean, black whip of a man, he towered over the little stranger. "Better come inside."

Sereda got up obediently and trotted into the great vault of the observatory. He stopped just inside the door and shook his head at the gloom. Far above in the shadows, the shining barrel of the giant telescope pointed into the sky like some fantastic weapon of the future. Its two-hundred-inch reflector had extended man's intimacy with space to include island universes hereto undreamed of. It had brought the faces of the solar family into easy view. Incidentally, although communication had not yet been established, it had given the people of Earth a grave respect for the accomplishments now so plainly visible on Mars.

The little man backed out of the observatory and stood in the sunlight. He spoke with the flat simplicity of a child who has learned something by heart.

"Light is good," he said. "Darkness is evil."

"You'll get sunstroke," said Dr. Raven.

But sunstroke was not for Sereda. He sat in the sun all that afternoon, soaking up warmth, smiling his sleepy smile. Only when the sun was gone, and the stars began to show in the lemon-green twilight sky did he yield to the attraction of the lights within the observatory and move inside.

It was mere chance Raven had been there that afternoon. Properly, an astronomer's day begins at nightfall. Not because of the darkness, of course. That factor, important to the naked eye in star gazing, means little to the two-hundred-inch telescope. But at night there's less distortion in the atmosphere, less dust and smoke. Often, fewer clouds. All in all, better conditions.

Those conditions suited Sereda fine. His days were spent in the more or less consistent California sunshine. Nights he spent within the observatory, while Raven and his gifted young assistant, Bob Ferris, went through the endless routine of observation, charting, photography and calculation that modern astronomy has become. He had been there almost a month before he got around to asking Dr. Raven for a workbench. Rather, he

amended quickly, room for a workbench.

"What kind of bench?" Raven asked. "What work?"

"Just for some simple experiments," Sereda coaxed. "They will make no trouble. And I will make my own tools and equipment."

Raven was again reminded unaccountably of the grave consideration of children, in which all things are either so or not so, with no stops en route.

"I humored the little guy," he explained to Ferris next evening. "He was so darn serious about it. And it shouldn't do any particular harm. I wonder when and where and what he eats."

"I dunno, but he sure got his bench up in a hurry."

"Is it in already?" Raven asked.

"Such as it is," grinned Ferris.

They went over and examined it together, while Sereda stood respectfully to one side. The bench was constructed from some plastic metal, rough and pitted, but solid-looking. As Ferris said afterward, it looked like the metal had been chewed into shape. Raven rubbed his hand reflectively over the surface and withdrew it at once.

"Not a very level working plane, Sereda," he said.

"It will smooth itself," Sereda ventured.

"What is it?" asked Ferris, touching the bench gingerly. It had a curious feel, a faint resilience. Ferris had a momentary impression that the bench was feeling him, appraising him, as he touched it. Sereda mumbled something incomprehensible in answer to the question, and Raven announced it was time to get to work as though he were glad to dismiss the bench from his mind.

Trouble was, it wouldn't stay dismissed. The subject came up again next evening when Raven came in about nine. Ferris was up on the platform, and Sereda was in his corner on the main floor of the building.

"He must have polished on that bench all day," said Ferris in amusement. "We should turn him loose on some of the brass work. See how shiny he got it?"

"I saw it," Raven answered shortly.

Bob Ferris looked at him in surprise. It was one of the few times he had ever heard Raven speak abruptly. He followed the direction of the older man's gaze. The astronomer was looking at Sereda's workbench. It looked small from that elevation, and every plane of it showed a reflection, as if light were striking it from every direction.

"Did you ever try to polish a piece of steel, Bob?" asked Raven suddenly.

"No," Ferris said, "I never did. Why?"

"It's a job," said Raven. "If Sereda had used the fastest cutting wheels known—even phosphor bronze dipped in oil and diamond dust—and worked all night with the skill and precision of a machine, he might have finished that surface. Shaping the legs and braces—well, that's impossible!"

"That may not be as hard as steel," argued Ferris.

Raven grinned sheepishly. "That's it, of course," he said. "I hadn't thought of that. I was getting my wind up over nothing. Just the same—"

"Look here, sir," Ferris suggested, "if this little guy annoys you, I'll chuck him out. I'll get rid of him. Just say the word."

"I wish I dared," said Raven.

Dr. Raven would have been hard put to find words for his uneasiness. There wasn't anything so menacing about Sereda. In fact the little man seemed to have a definite code of conduct. But it was a code based on some odd tangent. It was, Raven decided, like trying to fit the behavior of a highly civilized person into the society of Australian bushmen. He ran headlong into it in one of his conversations with Sereda. Raven felt the workbench was getting a little out of hand.

"You asked for room for a workbench," he reminded Sereda. "I agreed. But this"—he waved toward the twenty-five-foot segment of shining metal—"this is more than I bargained for."

"It's the same bench," said Sereda.

Raven smiled tolerantly. It was easily five times as long as the original bench had been, and along its whole length it gleamed dully. Raven would have given plenty for an analysis of the metal it was made from, yet he shrank from touching it.

"What makes it shine like that?" he asked.

Sereda smiled. "Light is life. Light is good," he said. "Darkness is evil. Darkness is death."

"Nonsense," Raven said not unkindly. "You're just afraid of the dark. It's a common phobia, but you should try to overcome it."

Sereda's wide mouth thinned, but it did not

lose its upturned smile. "Light is good," he repeated stubbornly.

"Another thing," Raven went on. "Where are you getting your materials? This table—these tools?"

He supposed they were tools, though he had never seen anything like them. They were many-shaped. Curving, slender fingers of shining metal. Odd coils, luminous and fragile. Stubby rods and queer, transparent chunks. The shapes were strange, yet vaguely reminiscent.

"They are needed in my work," Sereda answered.

"See here," Raven protested. "You seem to have a knack for metalwork, and I'm delighted to let you amuse yourself. But you mustn't interfere with the observatory in what you call your work. What is your work, anyway?"

"There must be more light. Now there is half darkness. Darkness is evil, is death. To destroy the darkness is to create life."

Raven's black eyes glinted in amusement. "*Fiat lux,* and all that," he commented. "Well, if you're going to abolish night time, you've picked yourself a real job."

Raven didn't stop to wonder how the job was shaping up, or how it was being done. Not for several weeks. Then it was brought to his attention sharply. Ferris stopped by to give Dr. Raven a lift on this particular evening, so they arrived at the observatory together, quite a bit earlier than usual. The sun was still touching Mount Palomar, though shadows were deepening in the valley below. They sat in the car for a while, watching the sunset.

"That little Sereda is wacky," Ferris said abruptly.

"What brought that on?" asked Raven.

Ferris pointed. Sereda was coming up the footpath to the observatory. He was carrying something heavy, and twice he stopped to look back. He climbed so as to be always on the edge of the sunlight as it lifted slowly up the hillside.

"He's lining the observatory," Ferris said.

"Lining it?"

"Lining it with metal like his bench." Ferris sounded more worried than amused. "He's got one big section of the wall finished."

"The hell you say," commented Raven.

"What I want to know, who is this Sereda? Where did he come from? What's he trying to do? He's doing things that aren't possible. They aren't even human!"

"Now don't get upset, Bob," said Raven.

"And another thing! People down in the valley say things are being stolen, and they've traced it to somebody on the mountain. All kinds of metal. One man said fifty of his chickens were killed, and their hearts cut out."

Raven swore softly. His biochemistry was rusty, but he remembered something about the Lindbergh-Carrell experiments—living tissue that grew in chemical solution. He resolved to read up on it when he got home.

Sereda came over the last turn of the path and saw the car. He hesitated, then walked slowly over to it. He was carrying a big coil of wire that he rested on the ground beside him. He put his hand on the car door, and Raven noticed that his fingers seemed dusted with some metallic powder. Briefly they seemed to be only caricatures of human fingers. "He's taller, too," Raven thought.

"The dark is coming," Sereda said.

"It'll be light tonight," Raven answered, and pointed to the full moon on the horizon.

"Not light enough," answered Sereda.

He gazed at the silver moon face, and his eyes narrowed to dreamy slits.

"There is a proper orb, one that doesn't spin madly to evade the light," he remarked. "It must be a peaceful, homelike place."

"Like your home, Sereda?" asked Raven.

He held his breath, but Sereda shouldered his coil of wire and went into the observatory without answering. Ferris got out of the car and followed. Raven rubbed his fingers along the car door. Where Sereda's hand had rested, four almost imperceptible hollows could be felt, as though the resting fingers had sunk into the metal. His lips tightened, and he went into the building with the hair on his neck rising.

It was too light inside the dome. Ferris made a wry face, for there was a subdued radiance about the whole lower level, a glow that seemed to reflect from the smooth metal walls. Sereda was not in sight.

"That tears it!" said Ferris angrily. "Look at those walls! I'm going to throw that little—"

He stopped, for overhead the whine of the machines began, the machines that open the dome and focus the big two-hundred-incher. Somebody had started the mechanism of the

world's largest telescope. Ferris was outraged.

With a roar of anger he went up the steps to the platform. Raven started to follow, then stopped as if struck, and walked unbelievingly to the workbench. Sereda had tossed the coil of wire on it as he came in. But what Raven saw was not the coil. It was a puddle of metal, still marked with looping lines to show it had been a coil of wire, but a puddle of cold, flowing metal that was slowly being absorbed into the surface of the table. He saw something else. Yesterday he had scratched a mark on the concrete floor, to determine the limit to which the workbench extended. It was now past his mark, by several feet.

Ferris' voice floated down furiously from the platform, followed by the chiming tones of Sereda. "What manner of man or devil is this?" thought Raven, and he went up the steps like a shadow.

The two stood facing each other, their heads swimming into view in the moonlight that streamed through the opened dome. The giant telescope had been leveled directly at the satellite. Sereda's eyes were almost closed, and there was a beatific smile on his round face. Ferris put out a hand as Raven came up, and gripped the older man's arm with a convulsive clutch.

"He wants to be the telescope," he said in a tight, flat voice.

"That's all right, Bob," Dr. Raven answered uncomprehendingly. "Let him see it. He can't damage anything by looking in the viewplate while we're here."

"He doesn't want to *see* it, he wants to *be* it!" Ferris corrected, and Sereda's disembodied head nodded in vigorous confirmation.

Raven made a startled, desperate effort to keep his voice even. "That's a big step to take, Sereda. Why do you want to be a telescope, anyway?"

Sereda's wide slit of a mouth opened ,and he bayed gently. "Crazy as a barn owl," thought Raven, "and I'm not far behind him." The words that tumbled out were mad, stream-of-consciousness fragments. "—glory of the lights that burn in the heavens, and are never dim, and are always bright, and life is in them, in the flow of light from the living stars—" Ferris looked as if he were going to be sick. Raven's black brows made a sharp diagonal across his forehead as one lifted and the other squinted down in a thoughtful scowl.

"Look, Sereda," he said. "In the viewplate."

They bent over the telescope, and the full Moon rode in solemn majesty, seeming at a distance of about thirteen miles from Mount Palomar. The face was at once transformed into mountains and plains; cratered peaks that seemed to reach almost into touch, and plains that spread dizzily like seas across the moonscape.

"Wouldn't you rather be the Moon?" His voice was soft.

Sereda looked at him thoughtfully.

"You could make it shine," Raven coaxed. "You could make it live and shine with light, and all the stars in all the sky would send their light to you."

Sereda bent over the viewplate again.

"No air to cut out the light," said Raven.

Sereda turned, and his head floated out of sight as he walked out of the moonlight and down the stairs. His feet made the faintest clanging noise on the metal steps. Raven turned soberly to Ferris.

"This is invasion," he said.

Throughout the night they could hear Sereda below. An occasional clash of metal rang like a muffled bell. The radiance within the vault of the observatory dimmed gradually, as he made trip after laden trip out the door.

Twice Raven's curiosity took him to the lower level. Once it was to try a drop of reagent acid on a fragment of the luminous metal. Nothing happened. The drop clung for a moment, then the metal seemed to twitch, and the drop rolled off and fell to the floor. There was no trace or stain on the metal.

The second trip was close to morning. There was no sign of Sereda in the building. Raven looked outside, and saw the little creature had piled his metal and his tools into a rough stack about twelve feet long. He had evidently grown tired, for he was lying across the pile, and in the wan moonlight he seemed half melted into the metal scraps on which he lay. The whole contour of the pile was rounded and streamlined.

Toward morning, there was a *whooshing* noise from outside, and when dawn came Sereda was gone. There was a shallow rounded trench in front of the observatory, a bed about twelve feet long that looked as though it had been chewed from solid rock. That was the

only trace, the only evidence that Sereda had ever been there.

Ferris and Raven both thought about the queer being a good many times in the succeeding weeks, but they did not speak about him until the press of circumstances forced them to. When the newspapers began talking about the Moon's strange brilliance, they could ignore it no longer.

Ferris looked up from his calculation. "The albedo is completely cockeyed," he said. "It's reflecting about five times as much light as it should."

Raven's knobby hands moved from the wrists in a characteristic gesture of puzzlement, like the working of a claw machine. He looked at Ferris, and saw only the untroubled interest of a schoolboy who has just found an unusual problem for his teacher. He spoke in the indulgent tone a fond parent might use to describe the actions of a naughty child.

Raven looked again at the Moon. "It's like . . . like stainless steel," he said, "or that stuff—"

"Sereda's metal," Ferris agreed. He chuckled reminiscently. "He was a funny little man."

"He wasn't funny," said Raven. "The last time we saw him he wasn't little. And I'm damn near convinced he wasn't a man."

Ferris looked startled.

"If he was human," Raven continued, "he's done one of two things. He's either brought the science of symbiosis to perfection, or established a metalline economy."

"Wait a minute," said Ferris. "Symbiosis is the combining of two life forms, like the union of spores and fungi to create lichen."

"That's what it is to us," Raven said. "We don't know what it might be to some entity outside Earthly experience. Sereda fits no Earthly matrix."

"What are you trying to do, tell me he was the 'man from Mars'?"

"Remember what he said the night he left? A proper orb, one that doesn't spin madly to evade the light."

"Mercury!" gasped Ferris.

"There was a meteor shower about a month ago," Raven recalled. "Meteors that came from Mercury's orbit. Probably half a dozen struck the Earth. Bob, they weren't meteors." He repeated what he had said that other night. "This is invasion."

Ferris looked back at the scope. "The contours are going," he said.

Raven bent over the viewplate. The familiar peaks and valleys of the Moon were almost gone. As he watched, he fancied he could see the easy flow of brilliance that was making the Moon's surface as smooth and polished as a marble. Even through the tremendous eye of Mount Palomar, it was now impossible to see more than a ripple on the gleaming sphere.

He looked at Ferris. "It's supposed to be only a quarter bright," he said. "The rest of it's shining by its own light."

"Look now!" Ferris said excitedly.

Raven's eyebrows met in a black diagonal across his forehead. Upon the luminous face of the Moon, new lines were showing. Not the line of contour shadow that had once marked the satellite, but flat black marks such as a child might draw to form a picture. They were very faint, and he thought they would not be visible to a less powerful telescope than this one.

"See it?" asked Bob Ferris.

"Yeah," said Raven, scowling at the viewplate. "It's complete, even to the wide smile and the black mole on his chin."

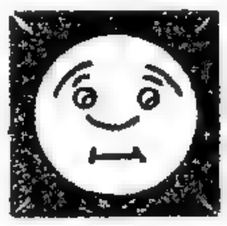
"Well, Dr. Raven, that ought to ease your mind," Ferris said. "Your invasion turns out to be a new man in the Moon."

"Does it ease your mind to know there's a creature capable of turning himself into a spaceship and traveling through the void?" rasped Raven. "Does it make you feel secure to know there may be others like him on Earth right now—inhuman monsters that devour metal and change their shapes into anything? Do you enjoy knowing that the cosmic barrier is rifted—that the moat of space is breached?"

Ferris wasn't paying much attention.

"Just imagine," he said. "No more dark nights."

THE END.



GOD'S FOOTSTOOL

By Malcolm Jameson

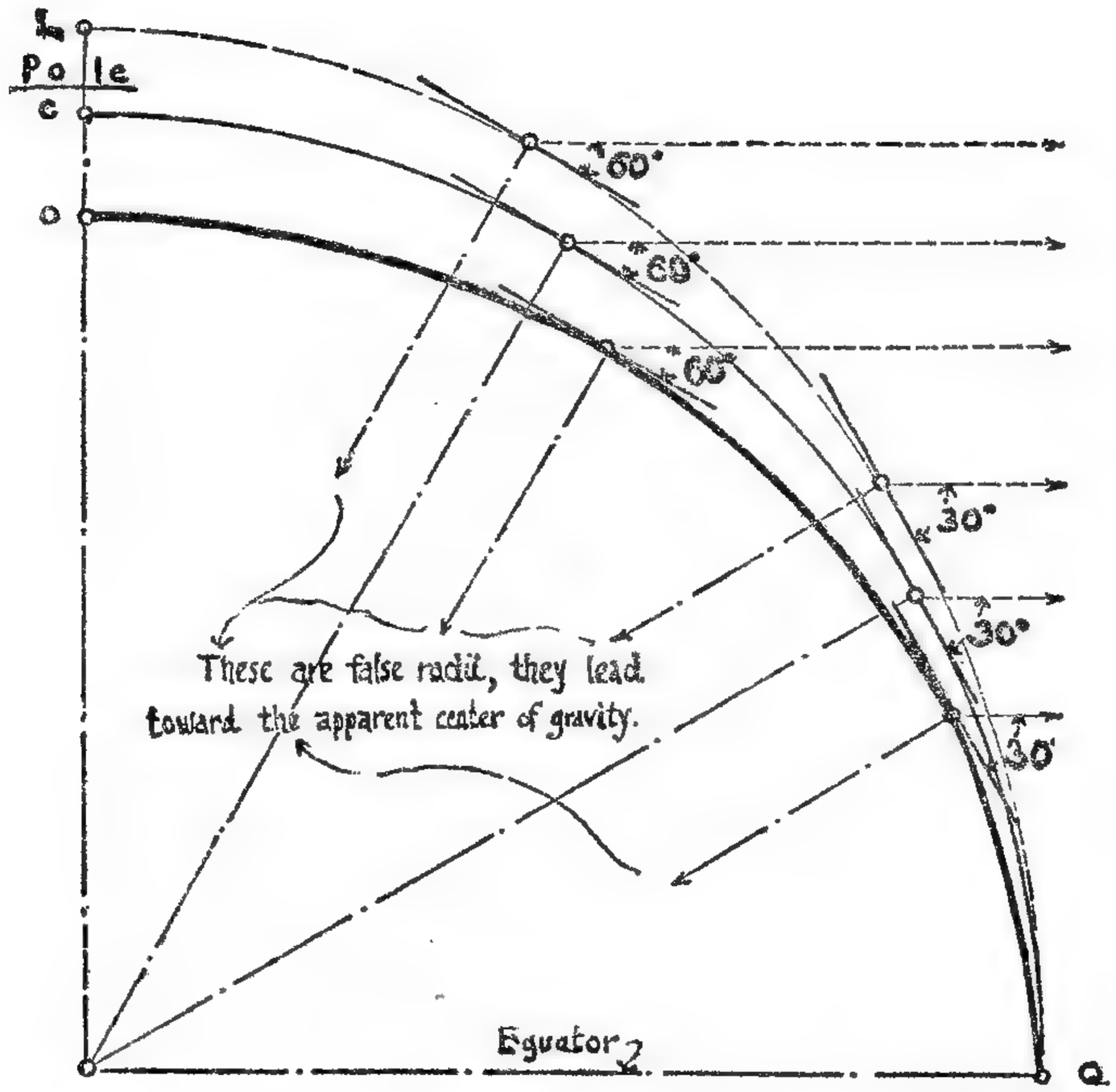
YOU may have heard the Earth was round. More correctly, that it's an "oblate spheroid." But if you think that's a definite shape, or that we know the shape of the planet even, this fact article may make things a little less clear. Saying "The world's all awry" is stating a fact, not an impression!

Illustrated by Jameson

We science-fictionists become so intent on inventing and exploring strange and fantastic other-worlds that we are apt to forget that the one we live upon is still far from being completely known. It will surprise many to be told that an elemental dimension such as the Earth's diameter has yet to be determined with exactness. When it is considered that that dimension happens to be the yardstick by which we have settled upon the dimensions of the Universe, it will be apparent how important it is. For from it as a base we have triangulated upon the Sun, Moon and planets and determined the size, distance and orbits of all the principal members of our own solar system. From the far longer base line of our own orbit—as determined above—we have triangulated on the nearer stars. And from those figures we have calibrated such ultramodern measuring devices as the spectroscope with which we probe the outer reaches of space. Any error in our primary base line becomes magnified as we reach out from it. A few hundred meters of inaccuracy here becomes a few trillion miles on the way to the Clouds of Magellan.

The difficulty lies in the fact that there is no way of directly measuring our own diameter. It must be computed from still shorter base lines carefully measured on the ground. This computation becomes difficult for the reason that so far we do not know the *shape* of the Earth. Exactly, that is. We were told as children that it is an "oblate spheroid" and has a mean diameter of seven thousand nine hundred eighteen miles. But how oblate? And is it regular? And how many diameters were used to make up the mean? The answers are that we are not yet in agreement as to the degree of eccentricity of the oblateness; that apparently the "geoid" is not regular, since there are unaccountable flattenings and bulges here and there—not all measured; and that there are at least three distinct dimensional axes giving as many basic diameters. Between those extremes there are as many individual diameters as there are places.

Mankind has been struggling with this problem for close to three thousand years. If we



1.

FIG. 1. *It would be a help to surveyors if "straight down" meant something fairly definite everywhere on Earth. But a range of mountains, the flattening of the planet—lots of things help bolix the works.*

could pick up the Earth as we would a ball bearing and place it between the jaws of a cosmic pair of calipers, there would be no problem. Oh, if we had suspected sooner that the Earth was something other than a sphere, a great deal more of progress could have been made.

The early Greek philosophers were practically unanimous in the belief that the Earth was round. Thales of Miletus, along about 600 B. C., was the first to clearly expound the theory; and Anaximander, in the very next generation, made the first globe. A few hundred years later we find Dicaearchus computing latitudes by measuring shadows at noon and constructing crude stereographic maps of the world. All these men went on the assumption that the Earth was spherical and that the Sun and Moon were also spheres, revolving about it. But they could not bring themselves to believe that the Earth could be as large as their rough measurements indicated it to be, and in consequence their little geocentric cosmos was woefully out of scale.

Two and a half centuries before the beginning of the Christian Era, Erastosthenes came on the scene. He was primarily a poet and a dramatist and librarian of the great library at Alexandria, but he was also interested in cartography and therefore in astronomy. He is called the Father of Geodesy because he was the first to make an accurate estimate of the Earth's true size. He knew that if you measure a considerable arc of any great circle on a sphere it is possible to compute all its other dimensions. So he undertook to measure an arc of slightly over seven degrees of the meridian passing through Alexandria. Having been born in Syene, some four hundred odd miles up the Nile and nearly due south of Alexandria, he recalled that at noon on a midsummer's day objects there cast no

shadows. So he took Syene to be under the Tropic, and therefore directly beneath the Sun on the day of the summer solstice. By observing how far the Sun was from his own zenith on the same day, he would know the difference in latitude between the two places. Using a gnomon—or shadow-throwing stick—he found that to be 7° 13′. Then, by referring to the cadastral maps of the lands between, which had been made by the Egyptian tax collectors, he computed the length of the arc on the ground.

There were errors in all his work, since Syene and Alexandria were not quite on the same meridian and also Syene was thirty miles or so from the Tropic. Likewise, his computation of the distance was probably inaccurate. But his results were astonishingly good. He found the plane of the ecliptic to be 23° 51′, or within twenty minutes of what we know it to be today. He stated the length of a degree of latitude to be 61.945 miles, which is off only three and one half percent from the figure 59.8 used now.

His work enabled Hipparchus, who followed, to vastly improve the astronomy of the time. Ptolemy rounded out the job by discovering the effects of atmospheric refraction on observed altitudes of celestial bodies, and by devising a plausible and ingenious theory of the solar system. The Ptolemaic theory was wrong, but it worked well enough for the times. It is one of the great tragedies of the human race that at about this point the beginning of the Dark Ages ensued For more than a thousand years all the splendid work of the early Greeks was lost, and the blight of superstition fell upon the world. The infant sciences of geodesy and astronomy became interdict. Later they had to be begun all over.

During those bleak and barren years all work did not stop, but unhappily we have lost the record of it. One Caliph Abdullah al Mamur caused a considerable arc of a meridian crossing the Plains of Shinar in Mesopotamia to be measured, and other Arabs carried on elsewhere. But the Western world had to await the coming of Galileo and Copernicus before picking up the thread again. Then came Keppler, Newton and Huygens. And with them the modern concept of the solar system, the telescope, and the famous Newtonian theories of motion and gravitation.

However, it was left to a comparative unknown—a Dutchman named Snell—to upset the apple cart and shake these theories to their foundations. He was a surveyor and wrote in Latin under the name of Snellius, or Erastosthenes Batavus. It was he who rediscovered the law of refraction and other refinements of observation, but his most significant work was the completion of an elaborate survey of the Low Countries, in the course of which he had carefully measured several degrees of their principal meridian. The year was 1615, which may be taken as the starting point of modern geodesy. What hurt about his findings was that if they were to be accepted as accurate, then the accepted notion of the size of the Earth was wrong.

Newton and Huygens read them and were disturbed. After considerable thought, Newton finally made the admission that perhaps the Earth was not a sphere, but something else —say an ellipsoid like the onion-shaped planet Saturn. After all, their computations had been based chiefly on measurements taken in Mediterranean Europe and northern Africa. The area was not large enough to develop any appreciable flattening as one approached the pole or increasing curvature toward the Equator.

A glance at the accompanying figure will show at once the predicament one finds himself in when he finds himself on a relatively huge—as to himself, that is—body whose size he can only compute from piecemeal measurements and whose precise shape is unknown to him. Given good telescopes, a knowledge of the phenomenon of atmospheric refraction, and a fair approximation of horizontal parallax, the determination of latitude presents little difficulty. By careful observations the altitude of celestial bodies at the moment of meridian transit, corrected for date, he can compute it directly. *If* the Earth were the simple sphere the Alexandrian Erastosthenes assumed it to be, and *if* his observations had been carried out with sufficient accuracy, no more would have to be done. But the figure shows the problem Snell uncovered. On the circle CQ all the degrees of latitude are the same length; on the profile of the oblate spheroid OQ the degrees get progressively longer as the pole is approached; on the prolate spheroid LQ the reverse is the case. The only way our surveyors and astronomers can find out which—whether onion, billiard ball, or lemon—they are standing on is to take samplings of the lengths of various arcs of the meridian at *all* latitudes.

We know now that the Earth is shaped like a roundish onion that has rolled down the cellar stairs and been battered slightly in the process. But they did not know it then. We do not know all about it yet, though the first serious effort to find out was begun about 1750. The kings of Spain and France had been induced to sponsor the appropriate expeditions, since in such world-wide undertakings international co-operation is essential, and in those days any major effort could only be made at the whim of a king. They authorized a joint expedition to the Spanish possession of Peru, which then included what we know now as Ecuador. La Condamine was in charge, and his task was to measure three degrees of a meridian adjacent to the Equator. At the same time, one Maupertuis went to Lapland to measure an arc from the top of the Gulf of Bothnia to the Arctic Sea. Wildly varying degrees of eccentricity were arrived at and it was apparent that the more they measured the less they knew. For the Maupertuis figures indicated that the Earth was not an oblate spheroid as postulated, but a prolate one.

The surveyors turned back to the more convenient middle latitudes. There they measured the ten degrees of arc lying betwen Barcelona and Dunquerque, then offset the line and ran up Britain with it as far as the Shetlands. By 1792 the scientists thought they had the answer. Lavoisier and others worked out the metric system with the meter as its base—supposedly exactly one ten millionth of the polar-equatorial distance. In 1801 Napoleon solemnly promulgated the system; the meter was the last word in accuracy. That it was not, but only a fair approximation, was due to several causes. For one, the profile of the Earth had other tricks up its sleeve that the French savants hadn't dreamed of. Moreover, their methods, judged by modern standards, had certain crudities. But more will be said of methods a little later, and of the subtle problems that are forever rising to plague the surveyor.

As great wars invariably do, the Napoleonic Wars brought an abrupt stop to all sciences depending upon international co-operation. But the moment they were over, the geodecists were at it again. This time they bit off the biggest hunk yet—the measurement of the long arc of land meridian stretching from the mouth of the Danube in the Black Sea straight

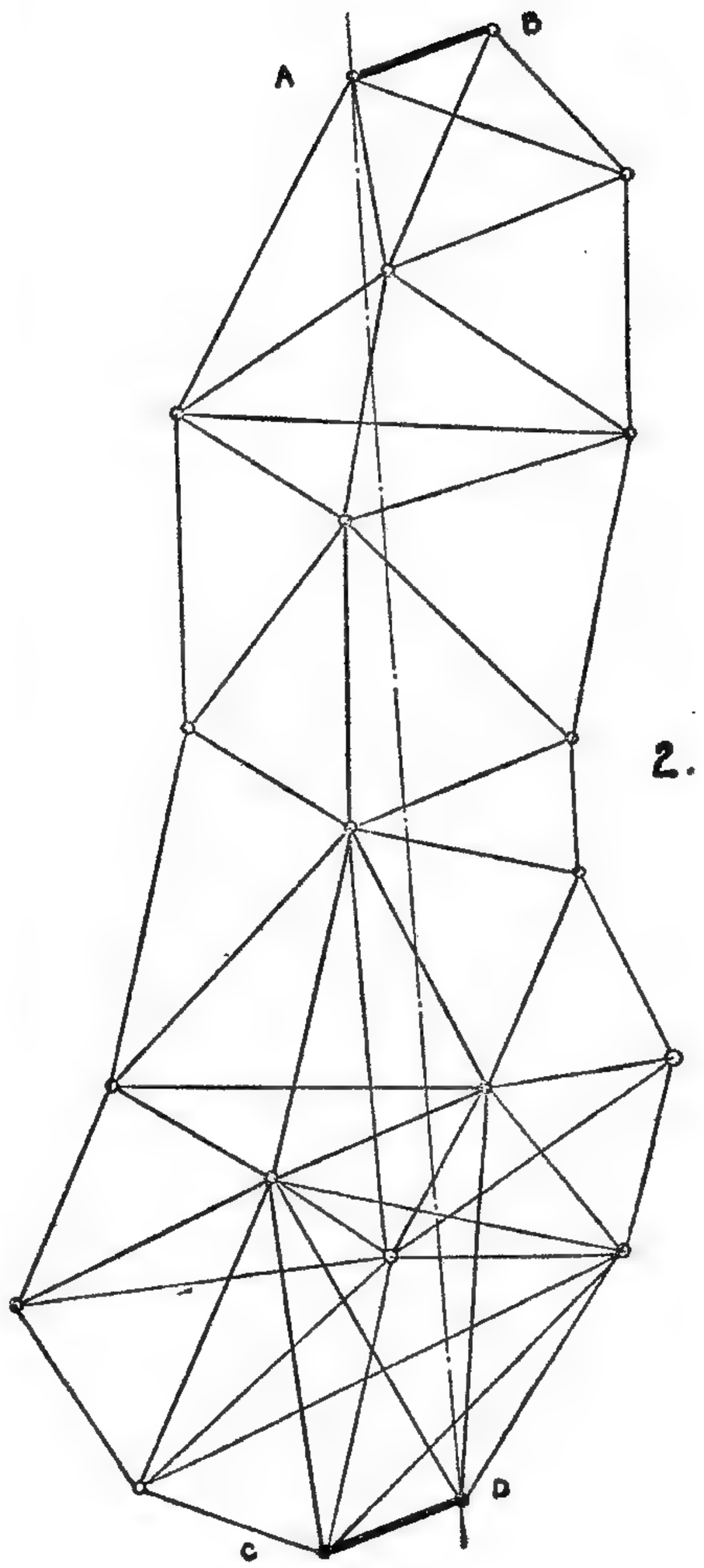


FIG. 2. *Not-so-simple, but fairly accurate way to go from Point A to Point D. For the exacting work of the Coast and Geodetic Survey, this is almost the only way.*

up through Russia and Finland to the Murmansk coast. That arc is over twenty-five degrees long and has the added virtue of running over plains country most of the way. Yet it took from 1816 to 1855 before the work was done. They learned more about the geoid, but ran into a puzzling flattening in the higher middle latitudes. So they went on to Spitzbergen and measured the short arc available there. In the meantime, work had been done in other countries, among them the United States.

Still the answer eluded them, though as early as 1841 the figure known as the Bessel Spheroid had ben adopted as the ideal one of reference. No one today accepts the Bessel figure as the correct one, but the surveyors of Europe still cling to it, chiefly for the reason that it seems to fit the contour of Europe fairly well, and more practically because they have mountains of tables and computations based on it and the shift to a more ideal one would be impossibly costly. Our own Coast and Geodetic Survey uses the Clarke Spheroid of 1866, which is somewhat flatter than the Bessel one, but conforms more closely to this continent. The true spheroid is thought to lie somewhere in between. In the meantime—and between wars—the surveyors of the world plod on, doing a little here and a little there and begging their governments for appropriations.

The task is truly stupendous and probably will never be completely done. The geoid they envisage is the figure the Earth would present if it were covered wholly by water. We, therefore, take the mean levels of the oceans as they exist as our starting point. That alone is a sufficiently hard task, as the oceans rise and fall twice daily with the tides, and prevailing winds pile up water for weeks at a time where it should not be. But by working patiently over the years with many tide gauges and duly correcting the results for the phase of the Moon and other things, a working basis for a beginning has been fairly well established. We think we know with some exactitude what we mean by mean sea level. But the moment the geodecist starts inland, his troubles begin.

The land is not flat. Vast areas of it are in accessible. Worst of all, its composition is far from being homogeneous. The last trait is more troublesome than would at first appear, for the lack of homogeneity of the land masses has a disturbing effect on g, the value of the acceleration due to the force of gravity. Which is unfortunate, for g has other uses than merely telling how fast things fall. It is, or should be, an infallible way of determining the elevation of land.

Any high-school student knows that g is a reliable constant and that its value is thirty-two feet per second. But the simple, round figure given in our intermediate physics textbooks is an oversimplification of the fact; it is at best a mean, or a theoretical value. To find what g actually is at any particular spot requires the swinging of a pendulum of known characteristics for many weary hours and counting the total swings against time. In the past few decades surprising results have been obtained.

Generally speaking, the force of gravity varies inversely with the distance from the attracting body. Therefore, since the Polar semidiameter is less than the Equatorial, we may expect objects to fall faster over the poles than at the Equator. They do, and also for the reason that g is tempered somewhat by the centrifugal force applied by the Earth's spin—though our planet's angular speed of rotation is only half that of the hour hand of a watch. So g is a function of latitude. And also of elevation, for a mountaintop is farther removed from the center of the Earth than the seashore. But pendulum experiments show variations due to the density of the underlying crust of the Earth. It may surprise many to learn that the ooze of the ocean bottoms, cubic mile for cubic mile, is far heavier than our seemingly massive mountains. That is the reason the mountain ranges have been squeezed upward. The g over Nebraska and Missouri is more out of proportion than over the Rockies, due to the denser sedimentary soil beneath.

It follows from that, that while g is an extremely useful adjunct in surveying, it is only one more tool. Coupled with other surveying methods, it is a check and it also tells us something of the nature of the substrata. The result is that the geodecists assist the geologists and vice versa—each assisting the other in making approximations, then further refining their observations.

There are other methods of telling elevation, such as vertical triangulation—which is not practicable except in rugged country—and the use of the barometer. But the barometer is even more subject than g to local conditions, varying as it does with humidity and tempera-

ture and more obscured causes. In consequence, the surveyer has had to perfect spirit leveling. In its highest form it is called "precise leveling." The standards for that are high. No line of levels is acceptable to the Coast and Geodetic Survey where the probable error exceeds a millimeter to the kilometer. And in this connection we must bear in mind that the elevations of the Earth are not like the elevations of the various layers of a layer cake, but like the differences between the outer and inner shells that make up an onion. The levels are actually observed as tangents to the surface of the Earth at the point taken, but if carried faithfully and far enough, would result in gross errors. How gross will be at once apparent when one remembers that the Earth's surface falls away from the tangent at the rate of six hundred feet in the first thirty miles, or twenty-four hundred feet in double that distance! The surveyor, therefore, has to be constantly correcting for that drop due to curvature, even while he is trying to determine just what that curvature is. Higher surveying is something like trying to hoist one's self by his bootstraps.

Yet, is it necessary to run the levels inland, for it is inland that the measurements of the meridian can only be made, and those measurements must later be reduced to sea level —whatever that really is. The problem looks insuperable, but marvelous accomplishments have been made. But essentially the program for the past three centuries has been this: make an assumption; measure; correct assumption; measure; recorrect—and on and on. The ultimate approximation is still a long way ahead of us.

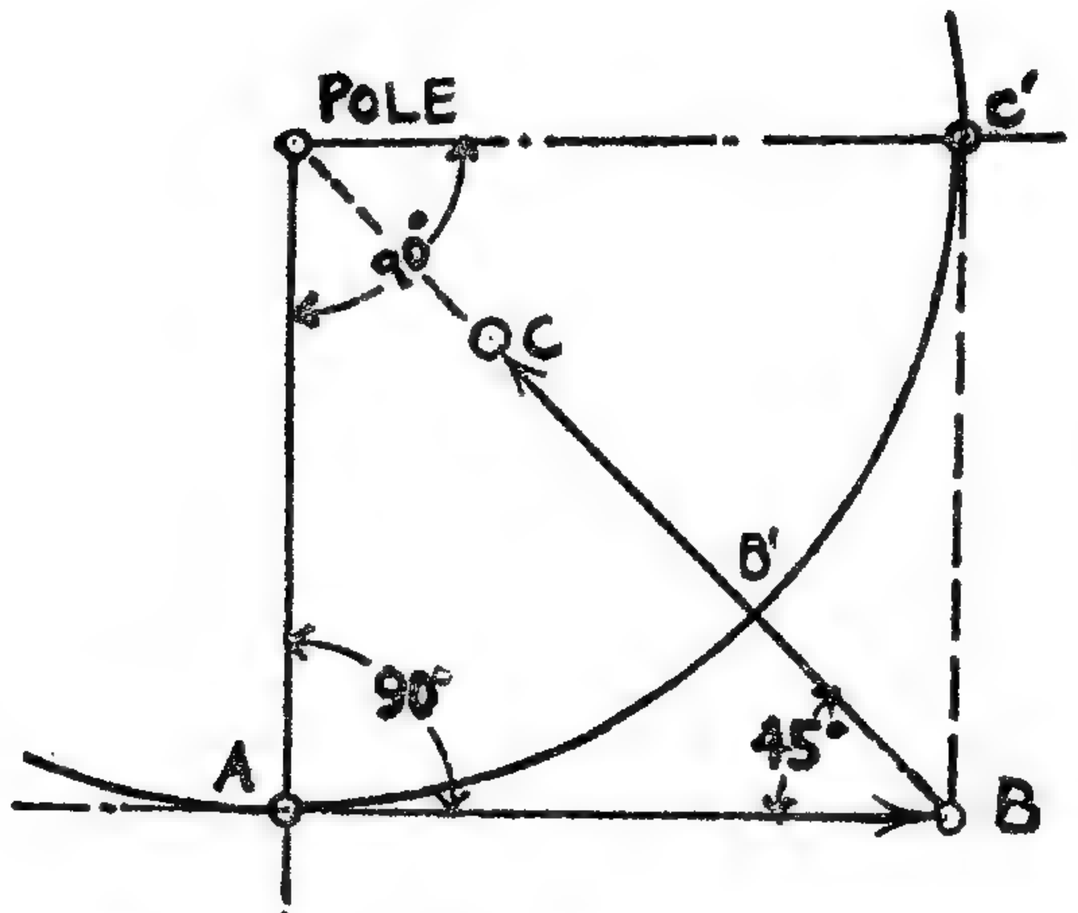
To get back to the business of the measurement of an arc of a meridian itself, let's digress a moment from method to resume the history of the study of the world from where we left it with the establishment of the two principal geoids of reference. In 1898 the governments of Mexico, the United States, and Canada, made a mutual agreement to measure that portion of the Ninety-eighth Meridian that lies in their respective territories. It is the longest possible one to be found on land in North America, being over sixty degrees long and extending from within twenty degrees of the Pole to the Pacific a little south of Acapulco, Mexico. It also possesses the advantage of running over plains country much of the way, crossing as it does the Province of Manitoba, our prairie States and considerable fairly even country to the south. A great deal of work has already been done on this job—and on many others, at the same time—but it is a task of great magnitude and cannot be finished without a great deal of time and money. A glance at some of the things a field party has to do on a primary triangulation will show why.

Let us say that it is desired to measure the meridian from A to D as shown in the No. 2 Diagram of the figure. Assume that the arc is about ten degrees, or roughly six hundred miles, and that a range of mountains, a forest, a considerable lake, and a big city lie between its ends. It is manifestly impossible to measure the distance directly along the ground, so it must be done indirectly by triangulation. That will require two or more base lines—one to start from and the others as checks—which will not necessarily have to lie on the meridian itself—as shown—but at any convenient nearby place. Since the geographical co-ordinates of the end points A and D must be known to three decimal places of seconds of latitude and longitude, and the distance between them with an uncertainty of less than one part in a million and a half—which tolerance amounts to about half in inch every fifteen miles—the surveyer must lay out his base lines with the utmost care.

The end points will have to be located geographically by observations on celestial bodies. That is usually done at night. The latitude is determined by observing the altitude of selected stars at the moment of their meridian passage; the longitude by the time of that passage. We have the advantage of our ancestors in now possessing accurate star tables, but are especially fortunate in the matter of time. Formerly chronometers were depended upon. They still are, but now they may be checked daily or oftener by radio buzz.

The most laborious part of the base line establishment is the actual measurement of it. The site must be level, and since level stretches of several miles in length are rarely to be found, it must be made level. That is done exactly as it would be done for a no-grade section of railroad—by cut and fill. Once the site is leveled, the measurement can start.

In the earliest days that was done by dragging chain or tape, but the best tapes stretch with pull and expand with heat, and however carefully both sources of error are measured and compensated for, the residual errors are



3

FIG. 3. *"A man walked due south five miles. then due east five miles, then five miles due north and wound up where he started," says the brain teaser. Maybe so—but he wasn't on this planet if he did!*

intolerable. Then came the day of the Invar steel ice-packed bar, but even that has been superseded. Invar steel has a remarkable low coefficient of expansion, and when housed in a tube of crushed ice with only the polished faces of the end of the bar exposed to the outer air is very constant in length, but yet less reliable than the perfectionists of the Coast and Geodetic Survey could bear. Today they use the Duplex Measuring Rod, which is more accurate and does not require expensive and often impossible icing.

This rod really consists of two rods—tubes, rather—one of brass and the other of steel, set close together in a common housing. The whole, some five meters long, rests on a pair of tripods with leveling heads such as support theodolites. The ends of the rods protrude just a little and may be extended slightly by adjustment knobs fitted with verniers that may be read under a microscope. Two Duplexes are carefully lined up at the start, almost in contact with each other, and leveled. Then the tubes are brought into bare contact by means of the knobs, brass to brass and steel to steel. They are allowed merely to touch; pressure would shorten them! The exact temperatures and the lengths used are noted, then the rear rod is switched forward and the line extended.

The virtue of this arrangement is that two simultaneous lines are run, one with rods of brass, the other of steel. Since both metals expand at different rates, the gross lengths of the two lines will not be the same. But the *difference* of the expansion of the two rods —expansion being a highly reliable phenomenon—tells the surveyors the temperature to more decimal places than they could hope to learn by direct measurement of it. So, when they apply their temperature corrections, they are not a great way from being right.

An interesting feature of this Duplex rod is that the tube wall thickness of each tube is based on that metal's conductivity and also with regard to its specific heat. Moreover, each rod is nickel-plated, so that they will then have equal power of absorbing and radiating heat. The resultant expansions, therefore, are strictly comparable.

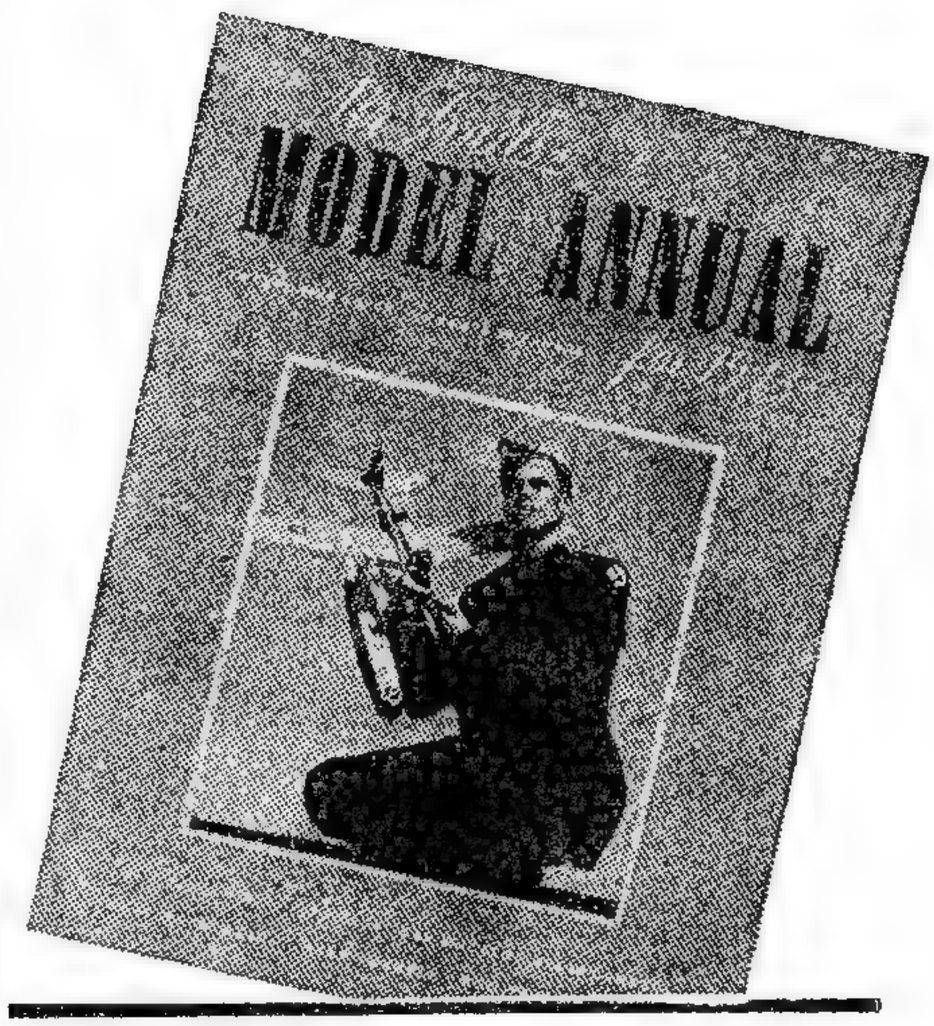
The surveyors may measure and remeasure the base line a number of times, averaging the results, but once they are satisfied with it, they are ready to proceed with the triangulation proper. By then the "signals" will have been built at strategic points all over the country they are to cover. A signal is something like a tripod oil derrick, except that it is built double, one tripod within the other, and with-

out mutual contact. The purpose of the double construction is to permit the observer to mount his instrument atop the inner tower while standing himself on the outer. This is to keep his pulse and breathing and shifting of weight from time to time from jiggling the theodolite. The signal is also fitted with a carefully centered flagpole or other sighting point, so that it may in its turn be observed from another station.

The observer climbs to his station, sets up his theodolite, carefully shields it with a big umbrella, and starts to work. The umbrella is to keep direct sunshine off his instrument, as otherwise the tripod leg on the sunny side would keep expanding and pushing the theodolite out of level. A great deal of work is done at night, the reason being that it is possible to see lights a great deal farther than day signals—a necessity where continuous hazy atmosphere is encountered.

A theodolite is a glorified engineer's transit, being larger, heavier and far more accurately built and graduated. They are carried in padded boxes and handled like babies, and are subject to many field adjustments which it would be tedious to describe here. It is sufficient to say that by the time they have been put into operation, they are as level and as accurately pointed as human ingenuity can do the job.

The observer next proceeds to measure the angles between all the other signals in sight of him, going entirely around the horizon. But he takes them one by one, measuring each angle hundreds of times. He gains a great deal in accuracy by *accumulating* his observed angles, rather than adding up a great many and averaging the results. This he does by manipulating his two azimuth plates so that each observation is added to the sum of its predecessors. An instrument large enough to be read to fractions of a second of arc would be too heavy to lug around, so the fractions are arrived at by dividing the sum of a great many observed angles by the number of them. Thus, what would appear as a thirty-degree angle to an ordinary engineer, equipped with a transit whose vernier only reads to half minutes, would come out to be 30° 00′ 06.14″ to a geodetic engineer who has a theodolite whose vernier can be read only to the nearest second. That is because he has observed that particular angle one thousand times and the accumulated total is 3001° 42′ 22″, which divided by a thousand gives the above.



MODEL FANS—

Here's What You've Been Waiting For!
THE AIR TRAILS MODEL ANNUAL

Imagine—96 pages of model airplane plans and photo features . . . 16 pages of blue and white, The Plan Book of famous planes and models . . . special sections for seaplanes, engines, scale models, gliders, radio control . . .

Including some material that you have requested reprinted from AIR TRAILS—with 2/3 all new material!

It's the model builder's dream of a Merry Christmas, a Happy New Year, and any other holiday's best feature. Buy one now—either for yourself or for that boy you know who loves to build models.

AIR TRAILS Model Annual

25c (30c in Canada) At All Newsstands

If your dealer cannot supply you, fill out the coupon below.

AIR TRAILS MODEL ANNUAL
79 SEVENTH AVENUE
NEW YORK CITY

Inclosed is a quarter (thirty cents in Canada). Kindly send me a copy of the new AIR TRAILS MODEL ANNUAL.

Name.....

Address.....

City.....State.....

AST—6R

To make dead sure that he has it right, he then goes at it backward and unwinds his angle! The result ought to be 00-00-00, but rarely is. So he has a second thousand readings to average with his first. Then to the next angle, the next and the next, until he is back to where he started. He has finished at that station.

All but his notes, that is. The sum of those angles must be 360°, plus or minus nothing. He may very well have an excess or shortage of a second or a fraction thereof. He will, therefore, doctor all his angles slightly by distributing the error among them. Then he goes on, station by station, until they are all done. It may take years for him and his mates to get from one end of their net to the other, depending on their luck with the weather, the size of the net and the number of men employed. But eventually there will come the day when they tie in to the base line at the far end.

The computation begins at this point—some of it in the field, most of it at headquarters at Washington. The interior angles of a plane triangle have to add up to 180°, but the interior angles of a spherical triangle may add up to a lot more. On this earth, as soon as a triangle gets to be as big as about seventy square miles, it rates another second. The bigger the triangle, the greater the "spherical excess." So our field man checks over all his triangles and has to do some more doctoring. It may seem paradoxical, but while the sum of the angles about a single point remains the same, the triangles may have anything in them. He has to know whether they are approximately right before submitting them to the boss.

The computers at the head office check everything and compute from one terminal base line to the other through various routes of selected triangles. They are very likely not to come out the same even though a geodecist scorns anything briefer than a seven-place log table. There will be discrepancies in the lengths of the legs of the various triangles depending upon the approach. At length, when all the preliminary computation is done, the intricate mathematical critique known as the Theory of Least Squares Adjustment is applied. That reveals the weak lengths in the chains and where the greatest likelihood of error exists. With those clues at hand, the computers proceed to distribute the errors in the proportion indicated. In the end final values are assigned and the field notes filed away.

Such Primary Triangulation nets cover many parts of our country. They are linked together by Secondary nets, the establishment of which are less exacting. They are further filled out by a system of Tertiary nets where the standards are even lower, but yet far higher than those by which ordinary land surveyors and other engineers work. Finally, the Geologic Survey fills in the grids with topography, which is tied to the entire basic structure. At last the maps are published and made available to the nation. Civil engineers of every kind make use of them, whether to locate railroads or highways, or to compute drainage areas for flood-control projects or culvert design; and State and county engineers tie to them when establishing boundaries. The practical value of the work done by these unpublicized government agencies alone justifies the meager appropriations on which they work. For the cost to the country of careless or ignorant basic survey work is far greater than is generally realized.

As an example of the consequences of crude work of our forebears, I shall mention one example, for it is a typical one of what breeders of grief and litigation sloppy surveying can lead to. It promises to give rise to contention for years to come.

The eastern boundary of the Texas Panhandle, which separates that part of the State from the State of Oklahoma, is defined as the one hundredth degree of longitude west of Greenwich. The line in question has been a boundary for more than a century; the above definition is rooted in historical fact. It was so described in an old treaty between France and Spain, concerning the boundaries between the possession of their territories Louisiana and New Spain. It has been persistently confirmed by later treaties between their successors—between the United States and Spain, after the Louisiana Purchase; between the United States and the Republic of Texas; and eventually between the United States—acting for the Indian and Oklahoma Territories—and the State of Texas. The boundary has always been the One Hundredth Meridian. Early surveys located it and marked its corners. The early surveys happened to not only be wrong, but badly wrong. They not only marked it as being many hundreds of feet west of where

it really is, but skewed it. And that is how the trouble began.

Ordinarily, a boundary dispute between two States is a matter of small moment to anyone but the fiscal authorities of the States themselves, since what is transferred amounts chiefly to the authority to levy taxes. But when Texas wins an award in an important border dispute, it is a different matter. For Texas, alone of all the States, entered the Union late and as a sovereign nation. She reserved her public lands to herself, with the result that the United States does not own, or ever owned, a single acre of Texas public lands. Now, the validity of a deed derives from the validity of the original land patent from which it springs. So when it was discovered that this more than hundred-mile strip of land was not in Oklahoma but in Texas, there was hob to pay. Though in parts of it there are producing gas and oil fields, every single landowner on it finds that he does not own his land, *and never owned it!* For the original grants of land were made by the United States government, which was without the right to make them. The Texan who discovered the error made haste to purchase the entire tract from the land office of that State. Now what?

Endless litigation, apparently. The supreme court of the United States has already issued its final ruling on the subject. The boundary is wherever the One Hundredth Meridian is, not where someone may have supposed it to be. The survey has been made and the boundary moved. All taxes previously paid to Oklahoma were erroneously paid; any income derived from the land by its former occupants is recoverable by someone—maybe. The situation looks to this writer like a lawyer's paradise. And there you are—the results of careless field work.

Having digressed to the extent of relating that one case—though there are many thousands of others—one thing more should be mentioned in connection with Geodesy. That is the item known as Back Azimuth. If the direction of B from A is its azimuth from A, then A's direction from B is known as the back azimuth. They are not merly directions in reverse—that is, if B is southeast of A, then A is not northeast of B. Not ever. If they are close together, the discrepancy will not be much; if they are distant from one another, the discrepancy is enormous. This is a harder

25c FOR A CRUISE AROUND THE WORLD...

And what a world! Not the war-torn one of today, but the glamorous, salty world of the seven seas! Street & Smith's new SEA STORY ANNUAL takes you from the Alaskan coast to the South Seas, from Gloucester to the Indian Ocean, by steam and by sail. And what grand yarns: Clarence Budington Kelland's FULL SPEED AHEAD . . . Ernest Haycox's LEEWARD OF STORM ISLAND, Albert R. Wetjen's THE PEARL OF KINOO. Readers of Colliers and The Saturday Evening Post know these authors well. Then there are eight other short stories, and two longer stories.

So come aboard SEA STORY ANNUAL for a real taste of the briny blue—for hours of reading pleasure that you'll never forget. Get your copy now.

SEA STORY ANNUAL

25c A Copy 30c in Canada AT All Newsstands

If your dealer cannot supply you, fill out the coupon below.

INCLOSED IS TWENTY-FIVE CENTS (THIRTY CENTS IN CANADA). KINDLY SEND ME A COPY OF SEA STORY ANNUAL.

SEA STORY ANNUAL
79 SEVENTH AVENUE, NEW YORK CITY

NAME.....

ADDRESS.....

CITY.....STATE.....

thing to explain to the layman than why you skip a Wednesday, or have two successive Wednesdays when you cross the International Date Line. But I'll tackle it.

It happens that on certain special great circles and in certain special cases, back azimuth is exactly 180° different from azimuth. Points on any meridian may be due north or south of one another; points on the Equator may be east or west of one another. That's all. There are no other special cases. Anywhere else, or in any other direction—even on those selected circles—the direction coming back differs from that going.

To try and clear that up, I am going to use a silly so-called brain teaser now current as the horrid example. It goes like this: "If you walked five miles due south, then five miles due east, then five miles due north and wound up where you started from, where are you? Why, at the North Pole, of course." Wrong. All wrong. The creator of that little gem was blissfully unaware of back azimuth, and therefore the fallacy in his brain teaser. Let's have a look at it.

Figure 3 of the diagram represents a five-mile circle about the Pole. It makes a very handy illustration, for at the Pole the convergence of the meridians is most obvious, and also the small area involved makes it possible to treat the situation as if it occurred on a plane figure and not a spherical one. So we will trace the Polar wanderer and see where he comes out.

He walks due south to A. There he turns due east. Due east would be at right angles away from north. If he goes five miles in that direction, he will wind up at B. Very well. He's at B. Now, if he goes due north from there for five miles, he will arrive at C, which is about two miles short of the Pole. The hypothenuse of a right triangle is longer than its sides, and he can't improve on it. Perhaps the author of the stunt intended him to travel the obviously circular path to B′, but then, that would not be due east, unless the walker were hairsplitter enough—and mathematics would permit—to break up his journey into an infinite number of infinitesimally small steps. No; due east, if he persisted long enough on the great circle that leads due east from A, would take him within five miles of the *South* Pole and back to A again. Nor would turning a second right angle at B and going to C′ help the situation any. He would still be five miles from the Pole. You work it out; I can't.

Here's what's wrong. B *is* east of A. But A is northwest of B. Any conscientious observer station at B with a sight of both A and the Pole would swear to it. There's your back azimuth. Due to the convergence of the meridians, no great circle crossing them at any angle whatever, no matter how closely spaced the meridians, will ever cross successive ones at quite the same angle.

In connection with that, try to dope out what direction a place in Siberia, exactly 180° east of New York and on the same parallel of latitude, is from New York, and vice versa. I contend they are *north of each other*. Certainly if you went due east from New York you would never come within thousands of miles of Siberia. If everything is foggy still, let me suggest the habit of globe study in place of maps.

Having dealt somewhat briefly with ways and means, let's return to the main theme—what is the form and size of the Earth? It may have been observed already that everything said so far deals chiefly with the Northern Hemisphere. The studies of our half of the globe have developed anomalies enough, since among other things we have learned that our world is some two hundred fifty meters thicker ninety degrees away from the Meridian of Greenwich than it is where Greenwich crosses the Equator. Is there, then, any reason for believing that the Southern Hemisphere is symmetrical with respect to our own? Who knows? Not much has been done there. Not much can be done there—there is so much water and so little land.

Arcs of meridians have been measured in Uganda and Rhodesia, and no doubt some geodetic work has been done in Australia and South America. There are two likely places where work might be done, but the fact remains they have not been exploited yet. The two adequately long meridians lying in the Southern Hemisphere are in Africa and South America respectively. The first is the extension of the old Finland-Danubian line measured during the first half of the last century. If that were prolonged, it could be followed almost to Capetown—the longest continuous land arc anywhere. The other is the Sixty-fifth Meridian west of Greenwich which traverses South America from Venezuela to

Patagonia. It has the defect of crossing almost impassable mountain ranges and the notoriously inhospitable Valley of the Amazon, with the further defect of lying in relatively poor and thinly populated country. From the present looks of things, it will be another century before those lines are run. Until then we can only take it on faith that our Earth is onion-shaped all over, instead of being a Burbank cross with a pear.

As things stand now, we know the diameter of the Earth to within about a half mile—a mater of no great concern to anyone but a geophysicist. It is entirely possible that we shall never hereafter reduce the amount of that uncertainty by much. Our Mother Earth is an enigmatic—and unstable—creature. The same tides that daily sweep the seas also sweep the supposedly rigid continents. There are, moreover, vast subsidences and upheavals in constant progress. Eccentricity and lack of homogenuity cause our plumb lines to point to anywhere but the center of the Earth, unless by accident. Our poles of rotation wobble, and when they do our latitudes and longitudes wobble with them. Likewise our magnetic poles wander about and the agonic lines between them are in ceaseless motion. It is going to take some time to get to know our home planet. Until then, the stairs can wait.

THE END.

THE ANALYTICAL LABORATORY

With rather light voting so far—the press date for this February issue is rather close to the release date of the December, 1942, issue—the order of choice on the stories is established, but there's a tendency of big differences in point scores. The results stand as follows:

Place	*Story*	*Author*	*Points*
1.	Weapon Shop	A. E. van Vogt	1.5
2.	Piggy Bank	Lewis Padgett	2.65
3.	Some Day We'll Find You	Cleve Cartmill	3.0
4.	Johnny Had A Gun	R. M. Williams	3.8
5.	Interlude	Ross Rocklynne	5.0

In voting on the stories contained in this issue—and your votes are earnestly requested; the magazine is intended to interest you, and I'm not properly equipped with accurate ESP—remember the Probability Zero efforts need votes, too. The men who wrote them have a deep and personal interest in your actions there; somebody is going to collect a twenty-dollar check, the particular somebody being determined by your votes as to who's the liar of the month.

I might add that the only way you can vote for yourself is to send in a Probability Zero yarn yourself; then you're welcome to vote for yourself. Admittedly it won't be apt to swing the decision, but I'm told there's a considerable satisfaction in it—

And we can use some really tall tales.

The Editor.

PROBABILITY ZERO

Calling All Liars!

BLUE ICE

By Henry Kuttner

"These new Q-type ships are fast," the admiral said, "but the fastest passage I ever made was some forty years ago, before they ever heard of inert drive. The tubs had speed in them, but we never dared push the throttle up to the last notch. The technicians said a human body couldn't stand the acceleration—they were wrong, of course. That's been proved often enough."

"Forty years ago, you said?" I prompted, after a little pause. "That's a long time."

"I'll never forget it, though." The admiral stretched out lanky legs toward the fireplace. "It was a Patrol boat, and I was junior astrogator. We were after the Zintara Martian gang—cutthroats, pirates, and rats. They fought by ray-burning you in the back. They'd picked up a vessel somewhere and kept raiding out by Jupiter, near the main trade routes. You know what Martians are like—spindly, tall chaps with faces like parrots and tiny eyes under retractable lenses. Anyway, the Zintara gang had raided a radium transport and got away with six ounces of the stuff. Killed the crew, too. We caught an S O S and headed in the right direction. But we lost the skunks."

"Too bad," I said.

The admiral didn't bother to look at me. "Oh, we found 'em again, by sheer chance, a week later. Near the Asteroid Belt it was. Our ship was fast; they didn't have a chance. Surrendered without firing a shot. That made us pretty mad; we knew what the Zintara gang had done to the boats they'd captured, and I suppose we wanted a chance to rough 'em up a bit. But they ran up the white rocket and came aboard without a murmur. Only they didn't have the radium with them.

"The Old Man, Larson his name was, talked to Zintara. He talked convincingly. Zintara went green and said he'd cached the radium on a little asteroid somewhere in the Belt. Yeah, he'd take us there.

"And he did. The prisoners were locked in the brig and we headed for the Belt. It took us about twenty hours to reach the asteroid, a very smooth ball hanging there in space, entirely covered with a coating of what looked like pale-blue ice. The atmosphere was good, though thin, and there was fresh water. So the Old Man ran staggered shifts and all of us had a chance to get out of the ship. But the prisoners stayed in the brig, except for Zintara, who led us to his cache. We got the radium all right.

"A while later we were in space, heading for the prison base on Pluto. Approximately ten hours later we went blind.

"It was that damned blue ice that coated the asteroid. It didn't hurt the Martians;

their vision's different, and they have those glassy covers to their eyes. But we got it, all right. Even the men who had stayed in the ship at first suffered—they'd caught the trouble through the ports. Like snow blindness, you know. And merely temporary. But within a few hours we were groping around the ship, completely blind, listening to the medic tell us that we'd be able to see again in a day or so. Larson, the Old Man, cursed Zintara, Mars, and every other planet in the System. But he wouldn't send out an S O S. We agreed with him; we'd have lost face badly. At that, all would have gone well if the Martians hadn't broken out of the brig.

"Somehow, Zintara had smuggled a ray gun in with him, and at the crucial moment—he'd timed it exactly, of course—that bloodthirsty gang came boiling out of their prison, yelling hell fire and damnation, picking up weapons out of their racks, and ready to tear us apart bit by bit. They liked that sort of fighting. Slaughtering blind men. We were completely blind—and that's a handicap.

"I was at the controls when word came through. Danton, the mate, gave us warning through the communicator. But, blind as we were, we guessed what had happened when we heard the Martians screaming through the ship—screams that came to us out of a dead, awful blackness. We couldn't fight 'em. They could see and we couldn't. But we tried to put up a scrap. The Martians wouldn't come to close quarters. They ran away from us, fired at us from a distance, chopped at our necks from behind. Oh, well." The admiral sighed, lost in introspection.

Finally I asked the obvious question.

"Eh? How did we—why, I thought you'd figure that out for yourself. Use your head, man. Zintara's gang could see and we couldn't. The trick was to get them on equal terms with us. I just jammed on all the power the ship had in her gravitors. Even though I was blind, I knew those controls. We started to go fast. It didn't take long to pass the speed we needed. Then, of course, there was a blackout, and the Martians were blind, too. We gave 'em hell."

"Blackout?" I said feebly.

The admiral looked at me wearily. "We were traveling faster than light, after I'd shoved on full power for a minute or so. We were moving at such a clip that the light waves that came out of the fluorescents were a thousand miles behind us before we could see them. So?" He spread out his hands. "That's perfectly clear, isn't it?"

"Yes," I said. "Uh . . . oh, yes. Perfectly!"

EFFICIENCY

By Colin Keith

Excerpt from General Court Martial proceedings in the case of Eric Strolsund, Chief Tubeman, Interplanetary Patrol Force, serving on board the sky corvette *Lisette* as acting chief engineer. The charge against him was that of jettisoning three hundred tons of Government-owned rocket fuel during the flight from Lunar Base to Oberon.

President of the Court: Strolsund, you have heard the evidence, and have admitted the act. Have you anything to say in mitigation of your acts?"

The Accused: Yes, sir. Plenty. I did it to save the ship.

The Court: Elucidate.

The Accused: Well, sir, it was this way. You know the *Lisette* is an old tub, and we had requisitions in for her modernization. Before we left Luna they put the extra parts aboard, and I was supposed to install them on the way out. That is what I did. First I pulled out our old Mark IV inspirators and stuck in the Eberle High-Life's. Then we junked the Morgan exciters and hooked up the new Universal super model. After that we wrapped the tube butts with Gilson coils so as to draw off the radiant heat to supply the supercharger auxiliaries. And then—

The Court: Don't be frivolous. All that is irrelevant and beside the point. Moreover, it is already a matter of record. So what?

The Accused: The bunkers began to bulge. I was afraid of the hull's splitting open and letting our air out. And since we were making fuel at the rate of ten tons a day, I thought it best to heave a few hundred over the side. That's all.

The Court: What is the point in mitigation you were trying to make?

The Accused: Well, sir, it was this way. Those Eberle High-Life's are supposed to save thirty-five percent of your fuel; the Universal exciters save another fifty percent; the Gilson coils save another sixty-three percent; and the rest of the gadgets add up to around forty-one percent more. If you'll get a paper and pencil—

NOISE IS BEAUTIFUL!

By Fox B. Holden

Chief Staff Surgeon Carhart Manung took a deep breath and blew hard. Through the swirling eddies of cigar smoke that he had so brutally disturbed, he found his chair and sat down.

The other scientists at the large banquet table managed to see him, but they thought twice about escape. Hearing Manung talk would be preferable to braving the blankets of smoke that stubbornly obscured the indefinite no man's land of the sinfully spacious dining room.

George Burt Edson, head of the Tri-State Medical Research Bureau, attempted bravely to grab the conversation first.

He should have known better.

"I say, Manung . . . that's you, isn't it? We . . . uh . . . dispensed with after-dinner speeches tonight. Sorry you were late for the dinner. It was a large one, and I'm afraid none of us are very talkative. It's . . . heh . . . nice without noise, though—" Edson tried vainly to smile the man into submission.

Manung chuckled from somewhere under his stiff white collar.

"You're wrong, my dear doctor. Noise is *beautiful!*"

Somebody sighed, and choked. This was it.

"Gentlemen, how do you suppose the Mars-Venus treaty ever got signed? No. The Venusians weren't dying from starvation. The Martians didn't have an overpowering fleet. People will tell you that, but they're wrong, gentlemen!"

"Al-l-lright—" Somebody asquiesced. He was drunk. "How *did* it?"

"Well, I was with the man—Gifford McWestebee—Mac for short—who carried the secret treaty papers from Mars to Venus. Radio couldn't be trusted—if the incensed, fanatic armies found out about the treaty before it was officially accepted and agreed to, they'd've revolted against their respective governments.

"So two of us were sent to Venus City via mosquito-rocket. We made our flight all right—almost. But as we neared the Venusian capitol, our stern tubes went haywire. Naturally, we tried to make it over the jungle between us and our goal, but it was no go.

"We crashed, gentlemen—and what a crash! Right in the middle of the only jungle military outpost between us and the city! If we were sighted our atoms would still be floating around Venus some place, and Venus and Mars'd be scrapping yet.

"That wasn't all. Mac'd banged his head a whale of a wallop on a stern bulkhead—right above the eyes. I knew it'd mean blindness if something wasn't done fast.

"I grabbed my small medical kit which I'd been farsighted enough to bring along, and got to work.

"I opened his skull. His auditory and visual synapses were a tangled mess. Operating even with ultra-modern equipment and my portable electronic-microscopes, I knew chances of Mac seeing again were slim. His hearing was definitely ruined. He'd be stone-deaf for life. But I set to work to do what I could.

"There was so little time—

"I operated with desperate speed. In forty-five minutes the job was completed as well as I could do it with the equipment I had. Forty-five minutes, and Mac's hashed-up nerve synapses were straightened out again. I knew he'd be able to see—never normally—but he would, as I'd feared, be stone-deaf. With such limited time, however, an expert nerve job was impossible."

Someone protested violently.

"If you think we'll believe *that*—"

"*That?* 'That,' as you phrase it, was only routine and in the line of duty.

"I revived Mac with a special nerve-tonic treatment, and he seemed O. K. when he regained consciousness. There was no time for examination or explanation—we struck out through the jungle immediately.

"It was twenty hours later when we had crawled, exhausted, to the edge of the outpost. A hundred more yards, and we would be safe, gentlemen—safe to deliver our papers into the right hands! Miraculously, we had escaped detection—

"I could hear nothing but our hoarse breathing. But, suddenly, Mac's hand jerked out and hauled me back—hard.

" 'Stop!' he said. 'Ahead of us—a patrol! We almost blundered into 'em! C'mon easy. We c'n take 'em by surprise!'

"And take them by surprise we did, gentlemen. Five of the sneaking rats were there—and if it hadn't been for Mac's superb hearing, we'd've walked straight into the sneaking band of patrolmen. The worlds'd be fighting yet!"

Someone roared protest immediately.

"Superb hearing? You said he was deaf!"

"Well—yes, in the ears. But we found later that I'd made an awful blunder. I'd crossed Mac's visual synapses with his auditory! He *saw* the noise of the patrol which I had failed to hear!"

The paroxysms that followed weren't from smoke.

THE ANECDOTE OF THE MOVABLE EARS

By L. Sprague de Camp

Among the human body's "vestigial organs," the textbooks usually list the scalp muscles which enable some people to move their ears. It is taken for granted that this talent is a use'ess one. Having once had my life saved by the possession of this faculty, I do not agree.

To begin with, there is a strong strain, in the de Camp family, of large mobile ears. When my great-uncle Clarence de Camp—who is still much alive—was in college about sixty years ago, a professor who was giving a lecture on anatomy mentioned the ears and their vestigial muscles. My great-uncle, who was in the front row, began gently fanning the air with his ears like an elephant using its natural radiators to cool itself. He soon had the class in convulsions, to the perplexity of the lecturer.

I had never considered the mobility of my ears an asset, and had regarded their imposing size as, if anything, a liability, until I went on the Drinkwhiskey Institute's Siwalik Pleistocene Expedition in 1932.

One day, while following a trail through the jungle of one of the lower Siwalik valleys, I rounded a corner and was horrified to come upon a full-grown bull *Stegodon ganesa*. The stegodons are proboscideans intermediate between the mastodons and the true elephants. Males of this particular species are noted for the hyperthrophy—overdevelopment, to you—of their tusks, which are thick, nearly straight, and may exceed a length of twelve feet.

Paleontologists had wondered how the animals could support such a huge weight of ivory until our expedition found the answer. The baby stegodon, as soon as it is old enough, is trained to run ahead of the old man supporting his tusks on its back.

This particular bull was unaccompanied by a young tusk bearer, from which fact I inferred that he was a rogue male. My suspicions were soon confirmed when the brute raised his trunk, emitted a fearful squeal, and started

TIDAL WAVE on Lake Michigan!

It was impossible—but it was true.

Two men were lost in it—and Monk, Ham and Johnny were nearly killed.

As for Doc Savage—well, there were too many "friends" who wanted to help find a missing man. . . .

It's a thrilling puzzle of death and destruction: WAVES OF DEATH, in the February issue of

DOC SAVAGE

10c A COPY AT ALL NEWSSTANDS

toward me with patently hostile intent.

To give you a full appreciation of my predicament, let me say that I had exhausted my ammunition; that the jungle on both sides of the trail was utterly impassable; and that I was already so loaded down with specimens that, in my aged and enfeebled state—I had a negative age of about seven hundred fifty-two thousand years—I could scarcely totter. To make matters worse, my beard had come untied, so that I tripped over it at every step.

In fumbling through my effects for some means of defense, I came upon a copy of the "Congressional Record" for 1941. How this publication came to be there, when it was not going to be printed for nearly ten years after our date of departure, I never did figure out. Time travel produces some bizarre effects.

In thumbing the "Record" over, I came across what seemed to be just what I wanted: transcripts of speeches by Senators Wheeler, Nye and Tobey. I began reading these loudly to the onrushing monster, changing the phraseology a little to fit the situation. I assured the stegodon that, as I had no aggressive designs on him, he could, logically, have none on me, and so forth. The proboscidean continued his charge, and I was regretfully forced to conclude that he was not amenable to logic.

My fumbling hands finally found my provision bag, whose chief contents at that time comprised one large cheese. I also recalled that one of the specimens I had captured was a twenty-foot snake, representing a new species of the genus *Python*. These facts gave me a daring and desperate idea.

I quickly removed the python from the specimen bag; as he had by now eaten all the other specimens in the bag, he was torpid enough to be easily handled. I got down on hands and knees, held the python behind me, and munched on the cheese.

The stegodon, now so close that his shadow fell across me, slowed his ponderous advance, as if doubtful. Now was the time to give him the works. I emitted a shrill squeak and flapped my ears with all the virtuosity of four generations of ear-wiggling de Camps compressed into one.

The stegodon gave a scream of terror, wheeled—knocking down two trailside trees with his immense tusks—and fled. I had won, and moreover had established this important scientific principle: *proboscideans in the year 750,000 B. C. were just as afraid of mice then as they are now!* And in me, with my python tail, my late antagonist saw no doubt the largest and most repellent mouse of the whole rodent tribe.

BRASS TACKS

Ouch Department!

Dear Mr. Campbell:

Can it be that your interior artists have succumbed to the spell of Flash Gordon? Oh, those monsters! Kramer must work on heavy-duty sandpaper. Nothing else could give his drawings that rough-and-ready look that no comic strip is complete without. However, with the exception of the illustrations for "Not Only Dead Men," Kramer's work in the November issue is definitely above par—for him.

Kolliker stands alone and aloof upon his rocky pinnacle. His work is not only scratchy but downright *bad*. His creations are still distinguished by their perpetual look of naïve astonishment, as if they, too, were surprised at such magnificent incompetence.

The cover was fairly well done, I thought, except that it seemed to lack unity. A coherent painting has a greater virtue than one whose brush strokes are technically perfect. On the whole, the cover painting impressed me as being one which was not well thought out.

Final Impressions on Art Work: Distinctly subpar. You need someone like Schneeman, who was not afraid to express himself in broad brush strokes. Finlay is out—his work is too delicate. Wesso's work is stereotyped—all his men are twins, and all his women are asinine.

Having dispensed with the *hors d'oeuvres*, we can now proceed to the main course—story

material. I regret that you have allowed yourself to drift into a pattern in the selection and layout of the material. The lead story is invariably excellent; "Overthrow" is no exception. These "Dawn of Great Promise" stories are right in my personal groove. "Four Little Ships" comes in second, mostly because I liked the way Author Leinster handled a difficult idea. Third place is a scramble between "Not Only Dead Men," "Minus Sign" and "The Gentle Pirates," with van Vogt skinning through. "Sand" should be buried under some.

Above all, Mr. Campbell, give us fewer ray guns, more Time paradoxes, less blood and thunder, more of Brass Tacks and, most of all, more emphasis on the social sciences and psychology. And, please, no more cowboy stories with Lensmen gallivanting around, shooting up the place, and raising general heck. I have had enough! War stories are all right, but kill as few as possible. Make the bullets go farther, and shoot fewer of 'em. But no parallels about Hitler. He stinks no matter what century you put him in.

More de Camp, please. He can liven up many a dull day.—Sam Salant, 1919 Eighty-first Street, Brooklyn, New York.

There's a change in the handling of interior art coming up. It will show in about three months.

Dear Mr. Campbell:

After many years of sitting on the sidelines I have finally decided to sit down and write a letter to the editor of s-f's best magazine. When your appointment to editor of Astounding was announced I was very sorry, for we lost our best author, but the last few years have shown that it wasn't so bad, after all.

When you took over Astounding was first among all magazines, but it had very poor covers, very poor short stories, an extremely boring readers' column, and no other departments. And then look what happened during the last five glorious years. First came Brass Tacks, then In Times to Come, the Analytical Laboratory, the Mutant editions, better covers, a definite change to a better class of advertisement and a better arrangement of them, then the Nova stories, the addition of the mighty Hubert Rogers, better stories, the long-hoped-for elimination of Science Discussions, "Slan!" and finally came the big editions.

This definitely showed that you had a real interest in the magazine, and this inspired the confidence of your readers. But, of course, all is not perfect, for while the covers *really* improved, the interior illustrations are bad. Please remedy the situation and Astounding will be PERFECT.

Now, for the best stories of 1942. This was the best year in "our" magazine's history, with a far better quality of stories than ever shown before. Here goes:

1. "Asylum," by A. E. van Vogt. Magnificent is the only word for this. In fact it is the third best story published in the last five years, "Who Goes There" being first and "Slan!" second. More please!!!

2. "There Shall Be Darkness," by C. L. Moore. Miss Moore has consistently shown herself to be one of the best authors of all time. One of her stories I'll never forget is "Greater Than Gods." However she writes very infrequently; please remedy this unfortunate state of affairs. "There Shall Be Darkness" was extremely well written, and very close behind "Asylum."

3. "Beyond This Horizon," by MacDonald.

why not make sure that you continue to receive this magazine throughout the year? Don't take the chance that your newsstand will be sold out—act now! Simply by filling out this coupon you can insure a solid year of reading pleasure with your favorite fiction.

ASTOUNDING SCIENCE-FICTION
79 SEVENTH AVENUE
NEW YORK CITY

Inclosed is $2.50. Kindly send me a year's subscription to ASTOUNDING SCIENCE-FICTION.

NAME.....

ADDRESS.....

CITY..... STATE.....

Very realistic, and far above last year's No. 1 story, "Methuselah's Children."

4. "Waldo," by MacDonald. A highly enjoyable tale by a highly enjoyable author.

5. "Recruiting Station," by van Vogt. This opus really had atmosphere. I really don't see why it didn't rate Nova. It deserved it.

6. "Second Solution," by van Vogt. Mr. van Vogt has really shown himself to be this year's best author, an honor that he shared with Heinlein in 1940 and with Williamson in '39. Last year Heinlein was all alone as king.

7. "Tools," by Simak. Another nifty, well-written tale. Simak can always be depended on to write at least one of the best stories every year. I will always remember his mighty "Cosmic Engineers" as among the best serials ever published in Astounding, and this swell piece wasn't far behind that other masterwork. More Simak, PLEASE!!!

8. "The Weapon Shop," by van Vogt. This list is beginning to read, the stories of A. E. van Vogt. But he certainly deserves it, for not since the Stuart-Campbell era have we had such a constantly *great author*.

9. "Second Stage Lensmen," by Dr. E. E. Smith. *Tsk-tsk*. Here we come upon the truly astounding situation of finding a Smith story in ninth place for the year. But I don't think it was a reflection on the story, it just showed how good the rest of the tales were. However this opus might be called a little too super, though not meriting the attack some of the fans made on it.

10. "Co-operate or Else," by van Vogt. And van Vogt rolls on!

11. "My Name Is Legion," by del Rey. Nice suggestion.

12. "Barrier," by Boucher. Best time story since "Other Tracks."

13. "Bridle and Saddle," by Asimov. This was a good year for Asimov. He turned out some fine yarns. His robot stories are the best in the field. This piece was extremely good, with "Foundation" close behind it.

14. "Nerves," by del Rey. Del Rey is without a doubt one of the best authors ever to write for Astounding, and this year he did some very excellent work. "Nerves" was very good and perhaps it should have rated higher, but then the competition was very stiff.

15. "Collision Orbit," by Stewart. Nice work!!! As you predicted Stewart-Padgett-Clement were very good. I also liked the "Twonky." Tied with this was Murray Leinster's bit. I'M VERY glad to see Mr. Leinster back. Keep him!!!

These weren't all the good stories by far. In fact there wasn't one poor story, and yours is the only mag in the field that can boast this.

Illustrations: The covers were all magnificent, even the ones without Rogers. Keep it up. The interiors, however, are another matter. Can Kolliker, Kramer, et cetera, et cetera. Keep Orban, however, he's your only good artist, the others are lousy. Of course, this doesn't include your best illustrator, M. Isip, but you use him so infrequently.

Other suggestions: Now that it must be becoming increasingly difficult to get stories, here is what I think is a good idea. How about reprinting in every issue one of the best stories from your back files? You could reprint Stuart's marvelous works, the "Skylark" series, "The Mightiest Machine," "Invaders from the Infinite," "When the Dark Star Passes," et cetera, et cetera, by you know who. Then there are the other mighty classics, "Rebirth," "Old Faithful" series. Schachner's mighty tales, Corbett's stories, the "Cometeers," et cetera, et cetera. I know that you could not only solve the problem of where the stories will come from, but also increase your sales as well. How about it—huh?

Well I think it is about time to cut off this long-winded letter. However, there are a few more things that I would like to say.

The Probability Zero department is very good. The best story there of the year was "Eat, Drink and Be Wary," closely followed by "De Gustibus" and "Pig Trap."

The best authors of the last five years are:

1. Don A. Stuart.
2. E. E. van Vogt.
3. MacDonald-Heinlein.
4. C. L. Moore.
5. Isaac Asimov.
6. Lester del Rey.
7. L. R. Hubbard.
8. L. S. de Camp.
9. E. E. Smith.
10. Williamson tied with Simak.

If you print this letter, please add this: I would like to get in touch with anyone who could sell me the June, July and August issues of the 1938 Astounding, as they are missing from my files.—Arnold Greenhouse, Leavenworth, Kansas.

OPPOSITES—REACT!

By Will Stewart

***SECOND** of Two Parts. The ship had been built by beings utterly alien —in thought, in form, in the nature of the very atoms of their flesh. They were made of contraterrene atoms; their ship was half made of that dreaded seetee—and full of a hundred death traps left by their alien minds!*

Illustrated by Kolliker

At the time, control of the Solar System was balanced on a knife edge of mutually jealous Powers. There was Earth, the Martian Reich, the Jovian Soviet —all, theoretically, working together in the High Space Mandate. But there was, too, Interplanet, an Earth-owned commercial corporation that wielded such economic power under the Mandate as to approach the status of an independent Power. And finally, there were the asterites—the hard pioneers who had settled on the asteroids and now wanted their independence from the rule of the Planets, exerted through the High Space Mandate.

The trigger that could blow that delicate balance to clashing bits was the secret of "seetee"—of contraterrene matter, matter that is made of positrons and negatrons and reacts instantly and with atomic violence when in contact with normal terrene matter of electron and proton structure.

Drake, McGee & Drake is a company of Asterites who have an asteroid laboratory where—opposed by every legal trick possible to Interplanet—they are trying to find how to handle the explosive, deadly power of seetee, to tame it into something useful. Captain Paul Anders, an Interplanet engineer and a captain in the High Space Mandate, is assigned to investigate the Drake, McGee & Drake set-up—and to find the secret of handling the untouchable seetee.

He goes to Freedonia, the asteroid laboratory of the Drakes, guided into a landing—reluctantly—by Ann O'Banion, daughter of an old friend of the elder Drake. The guide is necessary; Freedonia is surrounded by circling bits of seetee meteoric matter—and, because the Martian-German, Franz von Falkenberg, made an out-and-out holdup attack to try to steal their secrets, the asteroid now has a band of invisible mines floating about it in space. On the asteroid he sees the Drakes' failure—a forging hammer of pure seetee iron. The huge power hammer is a crude mass of meteoric seetee iron raised and lowered by paragravity fields to strike on a massive block of meteoric seetee iron that serves as the anvil. But it won't work; after half a dozen blows the huge iron hammer starts rocking in its supporting force-fields, and actually touches the terrene matter of the supports, releasing a short, violent blast of gamma rays and the hammer is stopped. The absolute necessity is a bedplate; some kind of rigid, strong and compact mechanism or shaft by which the two mutually destructive substances—seetee and terrene matter—can be bolted into solid alignment. Given that one thing, the problem of handling seetee could be licked in a month.

Then, going back to his ship, the "Challenge," Anders hears a photophone call from Rob McGee that's intended for the Drakes on Freedonia. Only because Anders is himself there can he intercept the tight-beam photophone. McGee has found a mysterious object in space, one he believes is a construction made by intelligent beings of contraterrene matter who origi-

nally inhabited the seetee planet that, crashing into the ancient trans-Martian planet, gave rise to the asteroids and their deadly seetee drift. McGee's found it—but a Martian warship, evidently under von Falkenberg, has followed, and is attacking him. One thing McGee does report for certain before his photophone cuts off—he has a perfect seetee-terrene bedplate. McGee, in the "Good-by Jane" had the Drakes' only ship; they can't help him. Anders, with his Mandate cruiser "Challenge" could. Again Ann O'Banion is—reluctantly—forced to pilot him to the place where McGee may have been destroyed. Reluctantly not only because she doesn't want to help an Interplanet man to the secret of seetee—which would mean that she and the other asterites would never regain independence—but also because of the unpleasant, polyglot crew of the "Challenge," Commander Protopopov, a Callistonian Russian, Anders' second in command, is a fat, stupid-faced man always finding complex and dubious reasons behind simple acts, and Ann hates him for it. Anders isn't any too keen on him, or the rest of the crew. But the High Space Mandate law requires that the Mandate forces be polyglot-mixtures taken from each planet of the System on which men have established colonies. Except, of course, the asteroids.

IX.

The huge Callistonian, Protopopov, came lumbering up the companionway steps to the bridge. His puttylike face held an expression of moronic expectancy. He glanced with his curious animal eyes at the clicking pilot-robot, and then faced Anders with the bearlike caricature of a salute.

"Yes, commander, we've left Freedonia," Anders told him. "Now we are bound for another object, unlisted in the *Ephemeris*, five hundred million kilometers south of the ecliptic. This is an urgent and important mission."

"Aye, sir." The broad stupid face broke into a sudden grimace of crafty admiration. "So these Martian agents were preparing another secret base, far out there, for a flanking attack on the Mandate? Ah, it's a deep and clever game you're playing, captain!" His small opaque eyes leered knowingly. "And I see why you've installed that pretty little asterite stool pigeon in your cabin!"

Anders tried not to flush. He gave Protopopov a cigarette and fumbled with his lighter, to conceal a wave of savage, unreasoning anger. At last, trusting his voice again, he said:

"True, Miss O'Banion gave us the position."

Protopopov made his bubbling chuckle.

"Aye, you've a way with the women, captain!"

"Commander, this is a dangerous operation." Anders couldn't help his voice turning brittle. "In spite of any aid I can get from Miss O'Banion, we are likely to encounter enemy forces, either at space or on the object ahead. We must take all precautions."

"You are very wise, captain," agreed the Callistonian.

"The ship will be blacked out, at once." Anders rapped the orders. "The crew will remain on twenty-four-hour alert. Periscope lookouts will be doubled. Thermalarm and photophone pickups will be set to full sensitivity. Gun crews will be drilled daily."

"Aye, sir."

"It is quite possible that we may encounter a Martian warship, trespassing on high space in defiance of the treaty. If any vessel is sighted, inform me at once and sound battle stations. If it is the Martian and he refuses to surrender, we must be prepared to blow him out of space."

"Aye, sir," came that rasping whisper.

"Also, commander," the Earthman added, "I'm expecting to sight a small space tug, the *Good-by Jane*. Unarmed, but very fast. It is necessary for us to take her skipper alive, if possible, because he is believed to possess information highly valuable to Interplanet."

"Aye, sir!" The Callistonian made his fat, moronic grin. "You're very clever, captain. You'll be winning medals and a juicy Interplanet bonus for us all!"

Anders left him on the bridge, ate a solitary breakfast in the cruiser's small wardroom, and went to sleep on a cot in the chart room—he hadn't really started the threatened chain of evacuations, because he didn't want to provide any personal dislike for the inevitable official disapproval of Ann O'Banion.

"'Smatter, gorgeous?"

It was noon of the second day out, and they were dining alone in the wardroom—the conventions of the High Space Guard forbade Anders to eat with his subordinate officers, but he had invited Ann to join him.

At breakfast she had been lighthearted and charming, as if the voyage were a thrilling adventure and they no longer need be enemies. But now found her staring at him over her teacup, in troubled silence.

Her tense brown face met his cheerful question with a shy, uncertain smile, as if she didn't quite know how to take such adjectives. She looked uneasily at the door.

"Nothing really, captain." Her voice was

muted and afraid. "Only I don't quite like your fellow officers."

He stiffened with anger and concern.

"If any of them has been improper—"

"I didn't mean that," she interrupted hastily. "But yesterday I saw Muratori looking after you, up the companion steps, as if he would like to shoot you in the back. Omura is always polite—much too polite, and you can't tell what he's thinking. And Commander Protopopov—that gurgling laugh of his just gives me the creeps!"

She leaned urgently over her forgotten plate.

"How can you trust them, captain?" Her cautious whisper was taut and anxious. "When you think of what we're after—the key to contraterrene matter! How do you know that one of them won't murder you for it?"

He grinned at her solemn concern.

"I can't trust any one of them," he admitted cheerfully. "But then, y'see, none of them can trust any of the others. Divide and rule—that's the way Interplanet runs the Mandate. Set a spy to catch a spy. We aren't going to be murdered—so smile again, beautiful."

But she didn't smile.

"And I suppose Commissioner Hood doesn't trust even you?" she whispered anxiously. "I mean, if you decided to join us and help get that bedplate for Drake, McGee & Drake—all your crew would be against you?"

Anders caught his breath. He was first surprised and then angry and then he laughed. He saw the moon face of the Venusian-Cantonese waiter appear inquiringly, and ordered another pot of tea. The girl's serious brown face turned pink before his laughter.

"Well, bewitching, you're a little optimist!" he told her softly, when the waiter was gone. "I come from three generations of Interplanet engineers. How d'you think you're going to charm me into turning traitor now?"

"I'm not bewitching!" she told him hotly.

She pushed back her plate, and ran out of the wardroom.

Early on the fifth day out from Freedonia, Anders climbed the bridge companion, from his cot in the chart room. Commander Protopopov, crouched at the periscope, turned with a shambling ursine swiftness to face him.

"This object ahead, sir." The huge exile's croaking whisper was deep with excitement. "I had assumed it to be only a stray planetoid, which these Martian agents had occupied for a concentration base against the Mandate."

"A logical assumption," Anders said cheerfully.

"But you knew it wasn't?" The Callistonian lowered his hoarse whisper, confidentially. His crafty animal eyes flickered watchfully at the companion; and then he searched the tall Earthman's face, with a look of penetrating cunning.

Meeting that blank flat stare, Anders almost shuddered. Despite his careless assurances to Ann, he wished that Hood's inside organization had been able to find him a different crew. Men willing to sell their loyalty for Interplanet dollars might sell again, for rubles or rupees or marks.

"Miss O'Banion had hinted," he agreed calmly, "that the object might be . . . er . . . a construction. I understand that it is the expression of a novel engineering principle. Our mission is to discover that principle for Interplanet."

The putty face brightened.

"Then it really is a Martian fortress?" whispered Protopopov. "But the asterite girl knows the password? And she is willing to betray it to you?" His broad moronic face broke into a hideous smile of admiration, and he brought his immense black-haired hands together with a startling crash. "Ah, my clever captain, a pretty woman can keep nothing from you!"

With desperate effort, Anders managed a thin smile.

"Forget Miss O'Banion." His voice turned brittle again. "Because hostile action is very probable. It is time to sound the action alarm. Change the periscope men every thirty minutes. Watch for those two ships—the Martian cruiser and the tug."

"Aye, sir." And Protopopov made a moronic smile, at his own invention. "But the men do not require the truth. Despite all our precautions, we may have Martian agents among them. I shall inform them that the object before us is the headquarters of a band of outlaw asterites, who have stolen a secret process developed by yourself for the manufacture of terraforming diamonds."

"Very good, commander." Anders grinned. "Although terraforming diamonds can't be manufactured."

The big Callistonian made his hollow, bubbling chuckle. With a bearlike salute, he

shambled down the steps. Impatiently, Anders turned to the periscope. McGee's object was swelling now, at last, before the decelerating cruiser.

The thing was tiny, still. But he could see the shape of it, bright in the sun, very sharp and clear against the gulf of frosty dark beyond. And, in spite of all he knew about it, the sight took his breath.

The object was shaped somewhat like an egg. His engineer's mind found the more accurate term, ellipsoid. But the curve of it was bound, about the smallest diameter, with an evidently massive rim. Thick supporting ribs arched up from that, converging toward the poles. And each pole was a jutting cylinder.

Its color puzzled him. All one end, including half the wide equatorial rim, was a dull rust-red. But the other half, after all the dead centuries since the Cataclysm, was still bright as new-polished chromium.

Another feature baffled the quick effort of his engineering brain, to read its purposes. Perhaps the projecting cylinders were twin air locks. The one-sided polish might have served for a crude sort of temperature control. But he couldn't understand the five golden spikes.

Slim yellow needles, each about the length of the smallest diameter, they were thrust straight out through equidistant ports in the bright half of the rim. What could they have been?

Nothing more, perhaps, than some queer sort of radio antennae. Yet, shining against the silver-dusted dark, those five spikes kindled in him and awed an eager sense of this thing's ancient mystery. They became a challenge to his engineering intuition, and an enigmatic promise of the lost world's science.

Then he noticed that one of them was broken. Nearly half of it was gone. For a moment he couldn't breathe. Somehow the realization was almost stunning. But that broken point was the hollow golden needle he had seen, in von Falkenberg's film!

That discovery brought him an awed sense of this thing's hugeness—for he had estimated that broken golden shaft to be a full hundred meters tall. For a long time, alone with the muted sounds of the pilot-robot, he tried to picture the dead builders of it—the beings that had walked that narrow contraterrene footway, with its railing far too high for human use.

He thought the Invaders must have been something tall and thin, but they were still beyond imagination. He left that useless effort, and tried to grasp the human meaning of Rob McGee's discovery. What would follow man's encounter with this alien ghost of the dead Invaders' culture?

"Please, Paul!" Ann's clear breathless voice brought Anders back from that groping question. Anyhow, he wasn't a social philosopher. He was just a spatial engineer, with an exciting job to do. The final consequences were outside his field. "Please, may I see?"

"Take an eye-full, gorgeous."

He yielded her the periscope, almost gratefully. She was fresh from sleep, her tanned skin glowing from a shower in what had been his private bath. All her movements had a boyish freedom, yet she looked delightfully and perhaps unwisely feminine in the blue silk lounging garment she had made from a pair of his pajamas—for all her own luggage had been unloaded on Freedonia.

He stood watching her, peering so eagerly into the black hood, moving the vernier controls with brown deft hands. Somehow he found a curiously pleasing reassurance in her vital, graceful youth. She was the living antidote to the cold dread he felt, from his first glimpse of that thing that was so very old.

"So that's the seetee ship!" Her own eager voice turned grave and slow, as if she, too, felt the awful weight of centuries beyond the time of men. "That's the machine the Invaders built— I wonder what they were?"

But Anders didn't know.

"And that's where von Falkenberg followed Cap'n Rob, and trapped him?" She looked around suddenly, her brown face anxious. "What happened to him, Paul? Have your lookouts seen the *Jane*?" Her voice turned thin with fear. "What happened to Cap'n Rob?"

"Don't know, beautiful." He grinned at her anxiety. "Our instruments haven't picked up either vessel. But that thing ahead is still hours away, remember, and larger than it looks. Both ships might be out of sight behind it. And the Martian would be blacked out and camouflaged, anyhow, so we couldn't see it yet. We'll just have to wait."

"But I'm so afraid, for Cap'n Rob." Her voice was tense and solemn. "He knows the meteors and planets, with that gift of his, but he never understands human beings—maybe they're too unreasonable. Cap'n Rob's so

simple and trusting, and von Falkenberg is so clever and ruthless. The *Jane* wasn't armed, and he had a fighting ship. Cap'n Rob just didn't have a chance."

"Cheer up, bright eyes." Anders wanted to quiet her alarm. "McGee may have passed us, somewhere on the way. There's lots of room in space, you know, beyond the range of our thermalarms. He may be back on Freedonia by now, putting his new bedplate under that hammer."

But she turned anxiously back to the periscope.

"No use crying till you know the milk is spilt," Anders told her. "Maybe McGee couldn't estimate von Falkenberg, but for all you know von Falkenberg failed to figure him. Now it's time to go to breakfast."

For Luigi Muratori had come to take the bridge. Moving with his quick, silent limp, the gnarled, bitter-eyed little Martian-Italian had reached the top of the companion steps before they discovered him. He made a nervous salute, and greeted Ann with an exaggerated bow. Giving him the cruiser's position, course, and deceleration rate, Anders added:

"You know the general orders. The crew will remain at action stations. So far as possible, we must be ready for any unexpected emergency. Watch that object ahead, and inform me at once if you see any movement. If any ship is sighted, maneuver at once to engage it."

Muratori made another jerky salute. His furtive eyes had already flashed at the periscope, burning with a fever of interest. His dark, scarred face wore an expression of savage intentness.

"Aye, sir!"

Ann O'Banion slipped hastily down the companionway, ahead of the Earthman. Taking her arm, he felt a little shiver. She said nothing, but he could see her frightened dislike for Muratori and the other officers.

Breakfast was set for them in the wardroom. Lifting the silver cover from a dish of shirred eggs in ham sauce, Ann made a childish little cry of pleasure. Anders grinned at her.

"Anyhow, beautiful, whatever you think about the rest of my crew, the chef seems all right!"

They were still at breakfast when alarm burst over the ship. Bells clattered, whistles shrieked, bulkhead doors clanged shut, feet pounded the decks.

" 'Scuse me, darlin'!"

Anders took the companion steps by threes.

"A ship, sir," Muratori reported. "Against that machine!"

Anders strode to the main periscope. The machine from the Invader already had grown a little larger, floating in the black abyss. In a moment, he found the shadow on the bright end of it—the tiny-seeming silhouette of a Martian cruiser.

X.

Anders looked and stood erect again, trim and spare in the black of the Guard. His brown face wore a slight stern smile, and his gray eyes lit with a glint of fighting steel. Briskly he ordered:

"Maneuver 99!"

Muratori's twisted nervous fingers touched the keys of the pilot-robot. It clucked and whirred, very quietly, and the *Challenge* spun into an erratic spiral course.

Here beyond the interference of air or gravitation, the extreme range of spatial guns was many thousands of kilometers—because shells, once fired, simply kept on going. Maneuver 99 sent the ship along a complicated path, intended to keep its position beyond prediction, even by the intricate brass brain of an automatic range finder.

Anders picked up the telephone.

He found Protopopov already at his post in the after control room, deep in the ship's armored heart. The special function of the officers there was to direct guns and engines, while the forward bridge dealt with astragation. But each room had a complete set of controls and instruments.

"General order, commander," the Earthman rapped briskly. "We have sighted a probable enemy. The range is still extreme, and sufficient to allow successful evasive action by enemy. We are closing distance. We shall engage this ship unless it surrenders when we break photophone silence."

"Aye, sir," came that croaking whisper.

Still decelerating, the cruiser dropped down a crooked helical curve. Anders didn't leave the bridge, but the instruments and the telephone brought him a keen awareness of all the men and metal of the ship, fused into a single fighting organism. His mistrust of polyglot officers and crew vanished, for the moment, before a glow of pride.

Ann remained below. Grinning to himself, Anders supposed that his fellow officers had somehow conveyed their stiff conviction that a woman's place was not upon the bridge of a ship in action.

At the main periscope, he watched the Martian. A tiny elongated dot, black as space itself, it crept very slowly across ridged, silver-colored dome. It was like some tiny planet, he thought, in transit across the disk of a silver sun.

"It appears to be drifting in a close orbit, held only by natural gravitation," he told the lieutenant commander. "No indication that our approach has been detected—or even expected."

"A perfect target!" Muratori agreed softly. "Shall we fire without warning?"

"No," Anders told him. "It will be necessary for us to speak to them—but not until the conditions of battle are adjusted to our satisfaction."

Steadily, the drifting dot grew larger against that colossal strange machine. It showed no lights, and bore no visible insignia. The ugly efficient lines of its flat gun turrets, however, were unmistakably Martian.

When the range was reduced to an easy hundred kilometers, Anders swung the *Challenge* to center the Martian like a bull's-eye against that silver dome. Protopopov reported that the four long guns were trained to fire. He broke photophone silence to hail the black ship.

No light answered. The dark ship made no sign. It merely drifted on, a tiny moonlet of that immense machine. Something gave Anders an uncomfortable prickling sensation, under the back of his trim military collar.

He called again in German, demanding a signal of surrender. There was no reply. He tried Chinese and Russian. For five eternal minutes, the blacked-out ship drifted on. His voice rapped brittle in the ship's telephone:

"Both turrets fire!"

The *Challenge* thrust back, to the simultaneous recoil of the four counterbalanced guns, so that he felt as if the deck had suddenly dropped away. Balanced on the balls of his feet, he peered into the periscope, counting off everlasting seconds.

A live ship might have darted out of the way, even after the flash of the cruiser's guns. But that black vessel merely drifted on, dead as the tiny moon it seemed. Thirty seconds dragged away, while half a metric ton of tritonite and steel hurtled across a hundred kilometers.

Then the Martian exploded into blue-and-yellow fire.

"Every shell a hit, captain!" The telephone brought Protopopov's hurried croaking whisper. "And still he doesn't answer. Shall we continue firing?"

Anders felt a decidedly uncomfortable sensation along his spine. He still suspected some deadly trap set for him by Franz von Falkenberg, but this seemed just a little too much

like shooting at a corpse.

"Cease firing, both turrets," he ordered.

He watched the Martian cruiser. After the smoke and flame of the shell bursts had dissipated into space, the black silhouette seemed scarcely changed. One of the flat turrets was a crumpled ruin, that was all. And still it drifted on.

"Eh . . . that?"

Anders uttered a startled little cry. The impact of that crashing salvo, he realized suddenly, had changed the drifting hull's direction. It had occupied what must have been a carefully calculated orbit, only a few hundred meters out from that huge machine. The shells had thrust it toward collision.

He watched, in appalled silence. This was something he hadn't anticipated, but now there was nothing he could do about it. He had meant to board the wreck, to find what had happened to von Falkenberg and his crew. But it was now too late for that.

He thought of something.

"General order," he rapped hastily into the telephone. "Martian is going to collide with that other object. Periscope lookouts will use ray filters. Better, turn instruments away."

He snapped the lead-glass prisms into the optical system of his own periscope. His eye took a moment to become accustomed to the reduced illumination. Then he found the black, battered hull once more.

It seemed to drift with a fateful deliberation. He waited through an eternity of breathless strain. Then at last the black, pointed snout of it touched that silver-colored dome. It plowed a furrow of hot, blue fire.

Slowly, then, as if some unseen gigantic hand were crushing it to ruin, the cruiser smashed against one of those immense arching ribs. Terrible fire dazzled Anders, even through the filters. He heard the click of the safety shutter, closing the tube of the instrument.

"Captain, what was that?" came the anxious croaking of Protopopov. "Did the Martian's magazines explode?"

"Doubtless," Anders told him.

After a dozen seconds, the safety shutter snapped open once more. Anders blinked and looked again. A vast cloud of fading red flame still covered the field of the instrument. The Martian ship was hurtling back through that curtain of fire, sagging and twisted, all one side of it still angry with white incandescence.

The red flame went out—it had been vaporized metal, he supposed, mixed with oxygen and steam from the ship's exploding tanks. The white heat of the shapeless spinning hulk cooled to canary yellow, to bright orange, and cherry red. Finally it was black again, plunging forever into space.

Anders studied the scar it had left on that bright dome. The long furrow still glowed lividly with heat and secondary radiations. The huge arching rib was twisted and bent, with a burning pit where its metal had been fused and consumed. Yet, so vast was that machine, the damage seemed comparatively slight.

The Earthman turned slowly away from the periscope. He felt a weakness in his knees, and a chill of sweat across his forehead. His throat was tense and dry, and the deck seemed about to drop again. He wanted time to relax. Carefully, he lit a cigarette, and burned half of it with three long inhalations.

"That seems to take care of the Martian." He crushed out the cigarette, with a thin smile at Muratori's sallow puzzled face. "But inform Commander Protopopov that I still expect hostile action. The men will remain at battle stations. Now the ship will move into an orbital position, twenty kilometers out."

Ann must have been listening for Anders' step in the corridor, for she unlocked the cabin door before he reached it, and stood waiting for him with a tense little smile. She let him in, and locked the door again.

"*Tut, tut!*" He grinned at her taut face. "What will Protopopov think?"

"Please," she begged anxiously. "I heard the bells and whistles, and felt the guns go off. I just want to know what's going on. Were you fighting von Falkenberg?"

Her dark hair was pleasantly disheveled. Warm and eager, she stood so near that he caught her slight perfume. Her slim tanned body filled out the crushed blue silk with very satisfactory curves. No, he couldn't much blame his fellow officers, for anything they suspected.

"We fired at a Martian warship," he told her.

"But the *Good-by Jane?*" He saw that her brown trembling hands had clenched into anxious fists. "Have you seen anything of Cap'n Rob?"

Anders stepped back from her. He sat down in the chair that had been his, and put his lighter carefully to another cigarette. He had almost forgotten little McGee. Now he remembered that the Martian warship had attacked the *Good-by Jane*. Could that be the reason that it had been drifting, dead?

His throat felt tight and dry again, and that chilly prickle came back under his collar. Ann O'Banion was still near and lovely, but now he remembered that she was also still an enemy.

"Not a glimpse, beautiful. But might be McGee that took care of the Martian. It was drifting, anyhow, and it failed to answer our signals. One salvo knocked it into that machine."

He gave her a brown admiring grin.

"But you have my congratulations, for the whole firm of Drake, McGee & Drake. I've seen normal matter touch seetee before, but never on quite that scale. Hadn't ever realized the nerve it must take, to run that seetee lab."

"Then Cap'n Rob was right?" Her gray eyes turned eager. "That machine's really seetee?"

"The silver end of it, anyhow." He smashed the cigarette in his own ash tray, and then saw her hairpins in it. "Sorry, beautiful. I can tell you more about that machine, a little later. Because, just as soon as we get in position, I'm going off to see what I can find."

"Please," she began urgently, "may I—"

"Not this time," he interrupted firmly. "Listen, precious, our friend Protopopov already thinks I have you snared with an irresistible fascination." He grinned at her quick flush. "Might misunderstand."

"Please, Paul, let me come!"

He looked soberly at her breathless face.

"You weren't looking, gorgeous," he told her solemnly. "You didn't see just what happened to the Martian cruiser, when it touched that machine." It was hard to remember that she was an enemy, and all the levity was gone from his voice. "Mustn't happen to you."

"Careful, Mr. Interplanet." She mocked his own brown grin. "And I can take care of myself. You didn't know that I put on Rick's gamma armor, while he was gone on a trip to Pallasport, and went out from Freedonia with old Jim Drake to help him cut that hammer and anvil out of seetee meteors?"

Her gray eyes challenged him.

"Ever work any seetee yourself?"

Anders gulped. It appalled him, to think of Ann's fresh and vital loveliness exposed to the danger of the frightful reaction that had crushed and fused the armored cruiser like a leaden toy. He made a feeble effort to answer her grin.

"Never did," he admitted.

"Then I'm coming." Her gray eyes were triumphant. "Maybe I can keep you from killing yourself. Anyhow, I'd feel a lot safer helping you explore that machine, than I would left alone here with your charming fellow officers."

Anders stood up slowly. For a moment his eyes were quizzical and grave. Then he bowed toward the anxious girl, with a faintly sardonic grin.

"You win, gorgeous," he told her. "If you want to help me get that bedplate for Interplanet, I have no right to object. You may get into your armor. We'll leave the ship in twenty minutes."

He heard the quick little catch of her breath. He thought she was going to speak, but she didn't. Tears made a bright sudden glitter in her eyes. After a moment she gulped, and turned quickly to unlock the door.

XI.

The tiny elevator dropped Anders to the after control room. Smaller than the bridge, it was padded with the same gray sealing plastic, crowded with duplicate instruments. Commander Protopopov turned, with his clumsy bearlike shamble, from the periscope hood. His flat animal eyes held a bright moronic curiosity.

"I'm going off the ship, commander," Anders told him. "You'll take command until I return. Hold a position twenty kilometers off that object. Permit no other men off the ship. I'm going alone, except for Miss O'Banion."

"Aye, sir." The huge exile made his blubbery chuckle. "So her pretty face is your safe conduct into the Martian citadel? Ah, captain, you're clever with the women. I envy your technique!"

Anders managed a bleak little grin.

"Enemy action is still very likely, commander." His voice rapped sharply. "What sort of action, I don't quite know. You will take every precaution. Possibly that ship may have been only a decoy, intended to lure us into the range of some unfamiliar weapon."

His own suggestion sent a chilly tingle down Anders' spine. *Something* had happened to the Martian's crew. They must have been dead or helpless or gone, before the *Challenge* fired. He couldn't guess what McGee might have found and learned to use. This strange derelict of an alien culture might carry weapons completely unknown.

"Wait twenty-four hours, commander." His voice turned brittle again. "If in that time we have not called or returned, you may consider that we are lost. Don't send a rescue party. And don't, under any circumstances, approach that object nearer than twenty kilometers."

"Aye, sir," the croaking whisper answered.

"If we don't come back within twenty-four hours," Anders continued, "it will be your duty to return to Pallasport at full acceleration. Maintain photophone silence. Keep the crew aboard when you land. You report to Commissioner Hood, in person. Give him the position and a full description of this object, as you have observed it. And tell him that it is what he sent me to find. You'll remember that, commander?"

"Aye, captain." Protopopov made his trained-animal salute, and his dark putty face brightened with conclusions of his own. "And Hood will order the Guard to attack it. That will mean war. And war means promotion!"

His hollow chuckle bubbled.

"You can trust me, captain!"

"Sure." Anders grinned. "But I intend to come back."

Ann O'Banion was waiting for him on the valve deck, a stiff and clumsy-seeming figure in the silvered bulk of her dirigible armor. Her gray eyes smiled through her face plate, watching him climb and twist into his own.

He snapped equipment to his belt: a heavy, lead-walled little spatial camera; fluorescent pencil and paper; a spare plug-in head lamp, more powerful than the adjustable photophone lights; his spatial automatic. The telephone rang. Muratori reported that the cruiser was in position.

Anders hung up the telephone. With an armored glove, he snapped his face plate shut. Ann followed him into the air lock. The inner valve clanged. Roaring economy pumps sucked the air from about them—and all sound with it, so they were left in a chasm of silence. At last the massive outer valve swung open, noiseless as a shadow. They swam out of the ship, into diamond-sifted night.

Anders looked back.

For a moment the *Challenge* was huge behind him. Its long guns were immense in silhouette, against the pale Galactic clouds. Somehow, they gave him a shock of unreasonable dread. He clutched unconsciously at his futile pistol. But it was much too late, he told himself, to mistrust his fellow officers.

The great valve slammed silently behind them, and the last glint of metal vanished. The camouflaged cruiser was only a long black shadow, across the glowing mist of stars. It dwindled rapidly. When he looked back again, he couldn't find it.

The Sun struck against their backs, out of the empty north. The black ocean of space seemed about to drown its tiny disk. Its own cold rays, Anders knew, took nearly an hour on the way. It didn't warm the insulated armor. He knew that the temperature was automatically right, but still something made him shiver.

The red glow of Ann's photophone light was only a warm red star, a little nearer than the rest, flying beside him. A wave of bleak loneliness made him glad that she had come, in spite of all the risk.

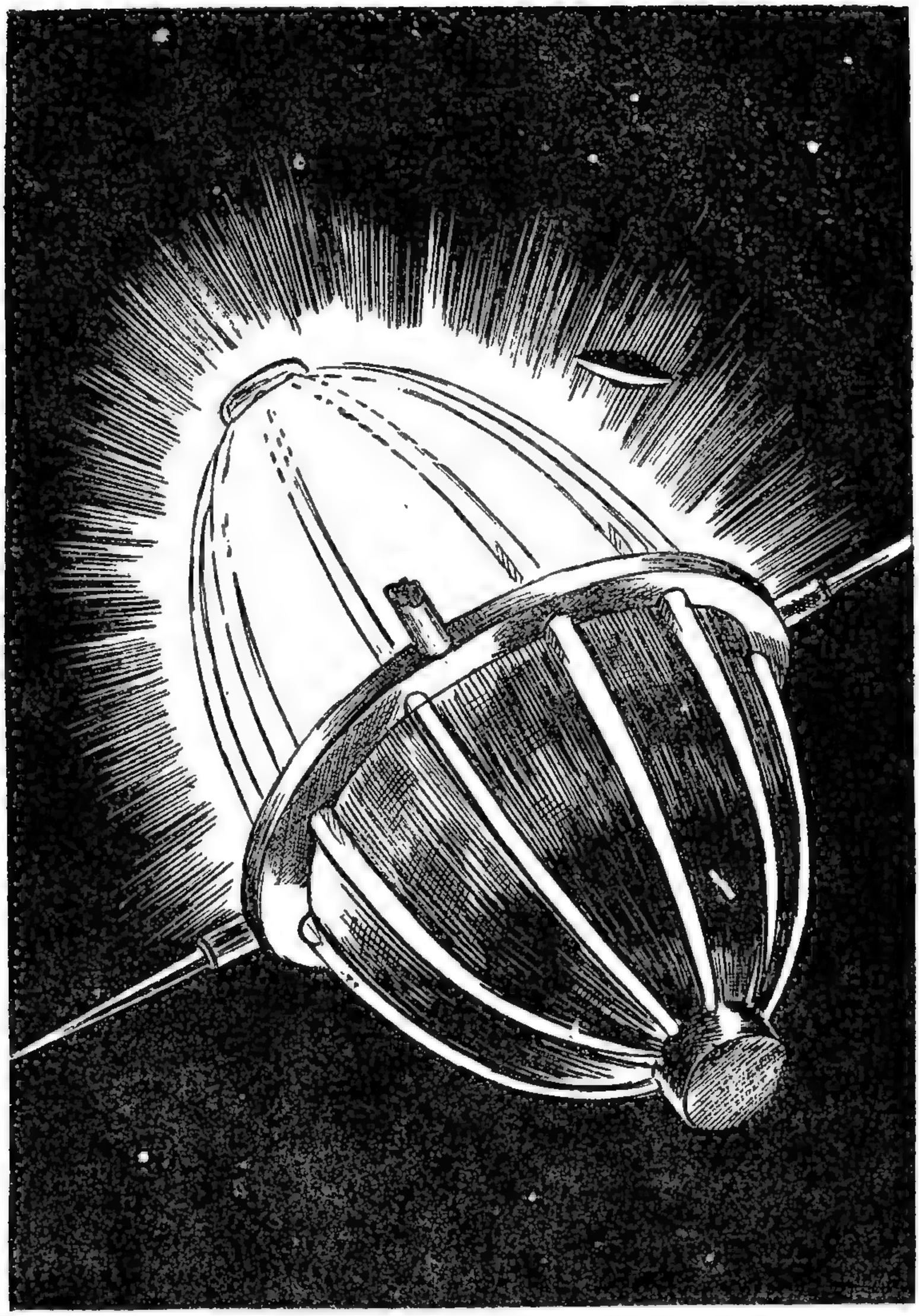
He wanted to speak, just to feel the warmth of her voice. But loneliness put a choking constriction in his throat. The thing ahead struck him with an impact of frightened wonder. He couldn't speak.

Against the stars, and the thin silver fog of suns too remote for the human eye to separate, the thing swiftly grew. The dome and the rim and the mighty curving ribs struck back the pale sunlight with a heatless glitter. The five golden spikes were bright enigmas. The rusted end was a red-black shadow, against the crystal black of space.

Anders stared at the deep dark scar, still faintly glowing with deadly radiations, where the Martian cruiser had plowed up annihilating fire. Again he was lost in brooding puzzlement, about the fate of the Martian's crew. Franz von Falkenberg was clever, and he must have known seetee. Yet something about this machine must have destroyed the spy and all his men.

"Paul?"

Ann's tiny muffled voice startled him at first, and then he was infinitely glad to hear it. He turned his plunging suit to face the red flick-



ering point of her photophone light, inquiring anxiously:

"What is it, Ann?"

"Nothing." Her low troubled voice was clear in his helmet, when the pickup cells faced her. "Only I wanted to talk to you. That thing makes me feel so terribly young and small and lonely. I'm frightened, Paul—but still glad you let me come. Please, you don't mind talking?"

"Not a bit, beautiful. Felt the same way." Her stiff silver sleeve pointed ahead.

"Queer, to think how old it is." She spoke in an awed, hushed whisper. "It has been moving on this same orbit, just out from the Sun and back again, for twenty times the length of human civilization. So long it makes you shudder!"

Still it grew, and she made a little breathless sound.

"It's so big— I had no idea!"

His engineer's mind was busy, automatically making estimates of the machine's dimensions, from the angle it had subtended at twenty kilometers.

"The long axis must be about six hundred meters," he told her. "Between those cylinders—ports or valves, whatever they are. The short axis would be something like three hundred meters. Those needles are about that long. Those ribs must be twenty meters thick. The thing's colossal!"

"Cap'n Rob, you know, said it had a mass of eighty million tons." Her voice was troubled again. "What do you think became of him, Paul?"

"Let's go on around it," he suggested cheerfully. "May find McGee on the other side, safe aboard the *Good-by Jane*."

Anders wasn't sure, however, that he really wanted to find that odd little asterite. The back of his neck still prickled too easily, at the memory of that dead, drifting ship. McGee's mathematical intuition had always seemed uncanny, and now there was no telling what he might have learned from this relic of an alien science.

They circled the machine, now only a kilometer away. They didn't find the *Good-by Jane*. But Ann caught her breath, with a soft frightened gasp. Her armored sleeve pointed. Anders saw another dark scar, deeply grooved into the mirrorlike dome.

"That was the *Jane!*" The red undulating glow brought her crushed whisper. "I see it, now. Cap'n Rob tried to take shelter behind the machine. But von Falkenberg found him, and the guns battered him against it."

"Might be, beautiful," Anders cheerfully agreed. "Or might have been just a terrene meteor. Let's go a little closer."

The small red star of her helmet light swam on beside him. He felt grateful for its presence, even if she had to be an enemy. She spoke again, wonderingly:

"What makes half of it so bright, when the rest looks so rusty and old?"

"Just wondering," he said. "Time to fire a shot."

He moved a little ahead. Unsnapping the light but powerful spatial automatic from his belt, he aimed at the center of the rusty dome. The little weapon jerked silently in his stiff glove, and spat a thin yellow flame.

He watched for the bullet to strike, and saw nothing. He fired again, at one of the great rusted ribs, and then at the polar cylinder. Still nothing. But a fourth bullet, shot against the silver edge of the rim, made a silent blue explosion that blinded him.

"That's it, beautiful!" he called softly. "Maybe they didn't know how to put that plating on terrene metal. Or maybe the thing got caught in a whiff of seetee gas, when the planets collided. But anyhow it's half terrene, and half seetee!"

He put back the gun.

"And now, gorgeous, we're going to find the bedplate, for dear old Interplanet." He grinned through the oval leaded lens. "S'pose that will be at the rim, where the two halves come together?"

Ann didn't say anything.

As they dropped together toward the rim, Anders felt a new awed sense of the machine's colossal size. For that massive circling band stood out a full twenty meters above the curve of the unlike domes. It was double, really. For the thin black line that seemed to separate the rusted ring from the polished one, was actually a space of more than half a meter.

Anders tipped his flying suit, to drop feet-first on the corroded ring. His gloved thumb was on the peegee rheostat, ready to anchor him down with a paragravity field. He was peering into that space between the unlike rings, trying to see what held them apart.

But Ann flashed in front of him.

"Just a minute, reckless." She mocked his own tone. "I thought you'd have a trick or two to learn. You'll find out you can't take anything for granted, not with seetee."

Carefully poised, above the broad pitted face of the rim, she unhooked a bit of thin wire from her belt, and reached out to touch it. Nothing happened.

"It's all right," she said.

Anders grinned, and they alighted on the ring. The rust-eaten surface of it was like a road, twenty meters wide, curving over the top of a rounded metal hill. Anders moved cautiously to the space that separated it from the other, silver-colored ring.

"Those are the bedplates!" Ann cried softly. "See—those disks!"

Then he saw that the narrow gap between the two unlike rings was spaced with thousands of thick disks. They had the same bright polish as the seetee ring, and they were fastened to it. But from the face of each

thrust a thick stem of rusty terrene metal, welded to the terrene ring.

Leaning as close as he dared, Anders tried to see the joining line, where the projecting stem of the nearest unit came together with the face of the disk. The joint was so close he could see no space between.

That fact startled him, and he moved back suddenly. The terrene stem was in visible contact with the seetee disk. He knew it must have been there for many thousand years. Yet he couldn't resist a feeling that they ought to erupt into annihilating flame.

"Look!" Ann's voice was breathless. "There's where Cap'n Rob cut out the bedplate he was going to bring us—before von Falkenberg caught him."

Anders followed her along the terrene rim. She pointed, and he saw where the silvered seetee guard flange had been cut away, to make room for a man to slip down between the rings.

He thought it must have been a precarious feat, but one of the units had been removed. Three thick seetee straps, which anchored the meter-wide disk, had been burned in two. The heavy terrene stem had obviously been cut with an oxyhydrogen torch.

Anders backed cautiously away from his examination of that evidence, to find Ann looking at him. Beyond the heavy lens, he thought her gray eyes were quizzical. Her helmet light quivered with transmitted speech.

"Well, genius!" Her voice was softly mocking. "You've found the bedplate, for dear old Interplanet. So what are you going to do with it now?"

"Don't quite know," he told her gravely. "S'pose the only way is to take one of them apart, to see just what keeps it from blowing up. But that strikes me as a somewhat ticklish job."

"It would be." She nodded gravely, beyond the lens. "There must be some terrific tension, holding the surfaces from real contact. If you happened to release it, the thing would probably explode like a shipload of tritonite."

"'Magine so, beautiful. What would you suggest?"

"I'm not working for Interplanet," she told him sweetly. "It's all your problem, smart-and-handsome."

"And I intend to solve it," he assured her curtly. "That cylinder looks like a valve, to me. The answer may be waiting, right inside. Coming, Miss O'Banion?"

XII.

Their dirigible suits lifted away from that broad ring of rusted metal. Anders saw that the red warm star of Ann's helmet light was flying very close beside him. Her low voice reached him:

"I'm coming, Paul. And I don't mind, really, if you want to call me beautiful."

He laughed, with the sudden release of nervous tension. Impulsively, he reached out and caught the glove of her flying armor. She clung to his hand, as they soared over the immense curve of the rusted dome.

"Thanks." He grinned through the leaded glass. "And glad you're with me, beautiful. This thing's so strange and old, it makes you feel uncomfortable. Feeling it's almost haunted, by the ghosts of the things that built it. Beside them, you're a very friendly enemy."

They came over the dome, back in sight of the point where they had left the *Challenge*. He couldn't help searching the star clouds of Andromeda, hoping to see its shadow. But of course it was much too far away.

They dropped toward the polar cylinder.

"Better let me go ahead," he urged her. "Something happened to those Martians—we don't know what. And if—" He paused a little, grinning. "Well, gorgeous, just be sure you're back on the *Challenge* in plenty of time. Y'see, Protopopov has orders to leave us, if we aren't back in twenty-four hours."

Her glove clung tightly to his armored hand for a moment, and then she let it go. Once more she swam ahead of him, to test the rim of the cylinder with the thin wire. It didn't react, and they alighted upon it.

"Odd!" Anders whispered. "Y'notice you don't need your own peegee unit, to hold you down. This thing's got a field of its own. Still active, after eighty thousand years. The Invaders must have conquered the field-loss problem, that we've been fighting ever since Maxim-Gore discovered paragravity."

The thin, heatless rays of the far-off Sun still found them, on the lip of the hollow cylinder. But the inside, lit only by the stars, was a chasm of black mystery. They turned up their helmet lights for illumination, and Anders plugged in the extra head lamp he had brought. But still the pale uneasy beams seemed too feeble to dispel the frozen, age-clotted shadows that filled the cylinder.

Ann stood on the broad rusty lip, staring

down the rosy searching beam from her helmet. Her smallness, even in the bulging armor, gave Anders a new sense of the machine's immense size. The black opening, he thought, must be fifty meters across.

As his eyes became accustomed to the fainter light, he made out huge flaps and hinges of rusty metal, down inside the lip. It was oddly difficult for him to puzzle out the way they worked—and he realized, with a chilly discomfort, that the very thought-patterns of their designers must have been completely alien. But after a moment he saw that they were the parts of an immense valve, which had closed the top of the cylinder. The valve was half open, now.

He moved toward it.

"Wait, Paul!" He could tell from Ann's strained voice that she was trying not to shudder. "Do you think we'd better go on?" Then she must have seen that he didn't mean to stop. "Wait for me!"

She leaped after him, off the rim. Slowly, resisting the pull of that strange paragravity field with the power of their armor, they floated down between the half-opened leaves of that tremendous valve.

The inside of the cylinder was a black enormous cavern. At first their feeble probing lights found nothing but further darkness. Slowly, however, Anders' searching eyes became adjusted.

A long spiral footway ran around and around the vast curve of the wall, slanting downward. At intervals there were level platforms, with black doorways beyond them. The dim floor of the pit was a full hundred meters beneath.

"A berth!" he whispered suddenly. "This pit is just a berth for a spaceship—and it's big enough to hold the *Challenge* a dozen times!"

He swam toward the nearest platform.

"These must have come level with the valves." His voice was quick, excited. "And the thing—the Invaders—went up and down that narrow walk." He remembered that other spiral way, in von Falkenberg's film of the broken golden needle, and tried to picture this berth as it must have been in use.

"I wonder what they were?" His voice slowed and fell again, to a burden of ancient mystery. "Seems they preferred a sloping ramp, to steps. Some of these doorways look too tall and too narrow, for men. And that handrail is too high—"

"Don't, Paul!"

Unthinkingly, he had reached out to that bright railing above the spiral ramp, where those other things had walked. Ann checked him, with that sharp cry of warning, and the shoulder of her darting armor brushed him away.

"Eh!" he gasped. "What—"

Then his startled voice dried up. For he saw the bright silver-colored disks of the bedplates, like geometric mushrooms on long rusty stems, that supported the curving footway. He saw that it didn't touch the walls, and noticed the inside guard rails.

"Thanks, beautiful!" It was a husky whisper. He watched her touch the tip of her fine wire to the railing he had almost grasped. It made a tiny sun of white atomic flame. "Stupid of me. Of course they had to use seetee walks and rails, even here."

They swam back from the deadly ramp.

"I wonder what this thing was for?" Ann whispered.

"Dunno, darlin'." His voice was shaken, still. "Far too big for a ship. Besides, it couldn't land in any atmosphere—because one half or the other would react. Must have been assembled out at space." He made a puzzled shrug, in the armor. "May find out, inside."

They dropped, toward the distant floor.

He waited, this time, for Ann to test it with her wire. It didn't react. They came down upon it. In the center was a massive cradle, which must have carried the weight of that vanished ship in its berth. About the cradle were six holes, some four meters wide, yawning black and somehow ominous in the floor.

Ring-shaped heaps of crushed rock surrounded the holes. Anders stooped clumsily to scoop up an armored gloveful of pebbles, and peered at them under his head lamp.

"Ore!" he exclaimed. "Mostly meteoric nickel-iron."

He looked up again, with new understanding, at the winding ramp and the platforms and the giant valve half open to the stars—and it gave him a curious brief sense of relief to recognize red Antares in the jeweled curve of the Scorpion.

"Ore?" questioned Ann.

"These openings are ore chutes," he told her. "The Invaders must have had a terrene ore ship with a seetee bridge, or maybe equipped

with remote control. Anyhow, seems they collected terrene ore—meteor drift, and such—and dumped it through these chutes."

He was peering through the nearest black opening, and his voice turned triumphant.

"Must have had mills and furnaces and terrene machine shops down below. This thing's going to make a pretty prize for Interplanet, beautiful! Just the blueprints for it would be worth more billions th—"

Ann screamed.

She uttered no ladylike squeal or yelp, but a deep-lunged shriek, which carried terror at high tension. Anders groped for his automatic and lunged to her side. Then he saw that she was standing still, merely pointing.

"Wh—" he stammered. "What is it?"

"Sorry." She made a nervous little laugh. "I'm all right. Only a little jumpy. I didn't mean to scare you. But—" Her voice turned husky, and he heard her gulp. "But yonder is a dead man."

The searching beam of Anders' head lamp found the dim figure, where she pointed. It was near the mighty curve of the wall. The dead man wore bulky space armor, black-painted. He sat on the floor, with steel-clad legs spread wide apart. His arms were closed fast around a massive iron bar, holding it upright. At the top of the bar, just above his dead helmet light, was the thick polished disk of a seetee bedplate.

The sight was grotesque. Anders thought the dead man resembled some clumsy toy, embracing the stem of a queer metal mushroom. He choked back a shocked, mirthless laugh.

The man in the black armor was really dead. His rigid, unnatural posture made that certain. With the slow escape of body heat from the suit, his flesh was probably already frozen nearly as hard as the iron stalk he supported.

"It isn't Cap'n Rob." Ann's whisper had a shaky relief. "But who could it be? And why was he just sitting there, holding that thing in his arms?"

"S'pose he's one of the men from the Martian," Anders said. "Might be von Falkenberg, himself. He wanted one of those bedplates for a model, like your friend McGee. Prob'ly intended to carry it out to his ship. Maybe weld it to the hull—'course he couldn't take it inside."

Their lights probed upward.

"There's where he got it," Ann whispered suddenly. "He cut it out from under that ramp." From the quiver of her breathless voice, [illegible] knew she shuddered. "But what killed h[illegible]?"

"Prob'ly ran a hand cutting torch off his own battery pack," Anders suggested. "Used more juice than he thought. The bedplate has a couple of tons of mass, with that long stem. Maybe he forgot this permanent field. Anyhow, when he got the thing cut loose, he didn't have power left to lift it."

Ann's voice shivered. "And he couldn't put it down!"

"Not without blowing himself through the roof." Anders stared at the figure in black. "The ramp was too high to lean it on, and he couldn't let the seetee part touch the floor. He just had to sit and hold it balanced on the stem, till his batteries gave out and his air unit quit. Waiting, maybe for his friends to come back. Only they didn't come."

Ann turned away quickly.

"A ghastly way to die!" she whispered. "Even for Franz von Falkenberg!"

Anders was bending closer, with his head lamp on that frozen seated figure.

"But it wasn't von Falkenberg!" His voice was startled, puzzled. "Anyhow, this isn't Martian armor. Jovian. For here's the mark, in Russian, of the Vladimir Ilich Ulianov Arsenal, on Europa. Don't quite understand—unless Soviet agents were after von Falkenberg, too."

"If the Jovians came, they're dead!" Ann's voice was high, breathless, close to hysteria. "They're all dead, now. Just like von Falkenberg, and dear old Cap'n Rob. Because this whole dreadful thing has been dead for eighty thousand years, and there's nothing here but death."

She caught his stiff glove, urgently.

"Please, Paul," she begged him, "can't we go back now, and get the Drakes? They know seetee. I think they could take one of those bedplates apart without getting killed. And that would be enough. There's nothing else we need."

He was silent, merely staring at the grotesque black thing sitting on the floor, supporting the rusted stem of that tall silver mushroom. She tugged at his glove, anxiously.

"Please," she urged softly, "let's get out while we can. This whole terrible machine is too strange, too different. We don't know what it was for, or how it works. Anything

we touch is likely to be deadly—like that railing. So, please!"

Anders turned away from the thing in black, to Ann. His helmet light fell through her face plate, so that he could see the brown curve of her cheek, and her freckled nose, and the frightened dark of her dilated, imploring eyes.

"Maybe you've got something, gorgeous." His voice was grave and slow. "The thing makes me feel just the same way. I'm not quite sure we need anything out of it. Might be a stroke of luck for the human race, if the damned thing blew itself to neutrons."

His eyes left her taut brown face. They followed the thin white beam of his head lamp, tracing that winding footway up and up into the thickening dark. The builders of it had used no steps, and the silver-colored railing seemed too high for men.

He lost the ramp in the blackness above, and his eyes hurried back to Ann. It was good to see the warm human curves of her brown cheek and forehead, and even the freckles on her nose. He squeezed her clutching glove.

"Don't know what they were," he told her slowly. "Seems they must have been different in quite a lot of ways. Science and culture must have been totally strange. Hard to say what an injection of their dead culture would do to ours."

She watched him, anxious and silent.

"Dunno." He shrugged, in the bulky armor. "No social philosopher, gorgeous. Don't even know how to approach the question, except in engineering terms. But I do know that when you put together unlike things or forces, you're apt to get a reaction."

Her intent face seemed puzzled.

"Constructive, sometimes," he continued softly. "Sometimes destructive. Sometimes

neither. Unlike poles attract. A light metal and a poison gas give you common salt, with a good deal of heat and violence. Paragravity plus the old corporation laws made Interplanet. Men in high space make spatial engineers. One terrene ship plus one seetee meteor equals one blinding flash. So what will you get when you add the Invaders' science to our civilization?"

"I don't know, Paul."

Ann's hand was tense in his, and he felt her shiver. Her silvered armor drew closer to him. He saw her frightened eyes flash uneasily toward the man in black sitting with the fatal metal mushroom in his arms.

"But you will come?" she begged. "Let's get away!"

" 'Fraid not, gorgeous." He shrugged again. "Don't mind my speculations. I'm just an engineer, and I've got a job to do. Don't know about the consequences, but they're outside my field."

He looked at the luminous watch on his sleeve.

"Let's try the ore bins, next. Bound to be terrene. Want to find out what they did with this machine. And we still have the most of our twenty-four hours. Want to come along?"

"Please—" She choked off her breathless protest, when she saw that he was moving. "I'm coming, Paul."

She followed him away from the man in black, to the lip of the nearest dark opening. He was stooping over it, peering down into the chasm beneath the floor. Dimly, far beneath, he could see the gray pile of ore, heaped against vast dark walls.

"On we go, beautiful," he said cheerfully. "For dear old Interplanet—"

Stepping over the rim, he heard the dry little sound in her throat, as if she had tried to scream and couldn't. He felt the quick snatch of her hand, at the neck strap of his armor. The thrust of her suit hauled him back.

"Now listen, gorgeous." He grinned at her. "If you can't take it, you'll just have to go back and wait with Protopopov—"

Still she couldn't speak, but he followed her pointing sleeve. He saw where his foot had started a little heap of broken rock to running in a thin stream down the chute. But what was strange about that?

"Don't you see?" Her voice came at last, dry and frightened. "Don't you see what happens to the pebbles?"

XIII.

For a moment he stared blankly. Then at last he saw that each little falling rock, when it had dropped a certain short distance below the floor, began to crumble and dissolve. Hard nuggets of metoric iron fell into fine gray dust.

Anders suddenly wanted to sit down. His skin felt clammy, and he thought he was going to be sick. He pressed down with his chin, to open the receiver in the front of his helmet intended for such emergencies. But the nausea passed, and he tried to grin at Ann.

"It didn't touch you?" she whispered.

He shook his head, in the big helmet. His throat was too tight and dry to let him speak. He kicked weakly, to start another little slide of rock fragments into that black pit. With a sick fascination, he watched them break into impalpable dust.

"Clever gadget," he gulped at last. "Used to hope I could hit on something like it, for our peegee refineries. S'pose it's just some sort of field that temporarily breaks molecular bonds. Stuff just falls to individual atoms!"

"Please," Ann whispered shakily. "Now won't you come back to the ship?"

"Embarrass me." He made a hollow little laugh. "Saving my life every fifteen minutes. But Interplanet is going to need this little gadget, y'know, nearly as much as that bedplate. Handy for mining, and drilling terraformer shafts, as well as milling ore. Billions in it—every shareholder can keep another mistress and grow another chin." He managed to grin. "Thanks again, gorgeous, but I can't stop now."

"Oh, Paul, I . . . I hate you! Damn Interplanet!"

Then she was silent behind him, as he moved away. He looked back. In the clumsy armor, she looked very small and lonely in that huge dark pit. Suddenly he wanted very much to go back to her. But she was still the enemy.

"Sorry, beautiful," he called. "Maybe you shouldn't keep saving me."

She made an angry little gasp, and followed him.

He lifted off the floor, toward a broad projecting platform twenty meters above. It was built against the rusty wall, and he saw no bright bedplates under it. He knew it must be terrene. But Ann swam silently ahead, and he waited for her to test it with the wire.

"Safe," she said stiffly.

They dropped on the end of it. The bright-

railed seetee footway sloped close above, supported on dark-stemmed silver mushrooms. There was a little landing, where the Invaders must have stood to watch their terrene machines on this platform. The landing seemed too narrow for human comfort, and the railing looked too high for men.

"A terrene dock." Anders flashed his head lamp about the long rusty platform. "They must have used it to load terrene machinery and supplies into the ore ship."

His searching light found a broad black doorway yawning in the rusty wall behind it. Two narrow railways were laid out through the doorway, across the platform. The rails ended sharply, and he thought they must have joined others on the vanished ship. His light found the black shape of a small rail car, and he moved quickly toward it.

"Now we're finding things!" he called cheerfully to Ann. "Must have had their terrene repair shops and warehouses, for the ship, somewhere beyond that door. All we've got to do is follow the tracks."

"Stop!" she whispered suddenly. "I can't scream any more."

But he had already halted. At the side of the rusty little car, something made a queer black heap on the dock. That something had been a man in dirigible armor. Both legs were sliced cleanly off, close to the body. The blood had dried, in the vacuum of space, to a thin brown stain spattered on the tracks.

Anders went up to it, gingerly, in spite of Ann's sharp cry of protest. He found the little silver plate on the breast of the black camouflaged armor. It, too, had been manufactured at the Vladimir Ilich Ulianov Arsenal.

He turned cautiously to the car. Its low metal bed carried a bulky machine. A number of round shafts projected through the top of the rectangular metal case. They had triangular heads, as if shaped to be turned with a special tool. Sunk in the end of it toward the dead man he saw two hollow copper-colored cups, each with a tiny diamond point projecting from the bottom.

"Must be some sort of mining machine," he decided at last. "Prob'ly used that bond-breaking field, projected to make a cutting blade. Must have made it to slice up meteors too big to handle. Our Jovian friend didn't know it was loaded."

Ann looked uneasily at her watch.

"Now, Paul," she whispered hopefully, "can't we go?"

He had started around the end of the little car. Her voice turned him back, in front of the dark yawning doorway. Behind the oval lens, his light found Ann's taut protesting face.

"I'm going on," he told her. "Hood will want more notes and pictures. Still got to find out what the whole damned thing was built for. Better wait for me, beautiful. I'll try to be careful—but don't you forget the time."

He was about to go on, but her anxious face held his glance. The stray wisp of dark hair across her brown forehead made her look like a lost, frightened child. She seemed tired, and hurt, and desperately afraid. He saw quick tears start into her gray eyes. He expected some hysterical outburst. But she only made a bleak little nod, and started to follow him.

Then something moved.

The chance sweep of Anders' head lamp caught the movement. It was on another projecting platform, far across the great pit, and far above them. The beam was too faint, at that distance, to show any details. And the moving thing dropped quickly out of sight.

Anders was frozen. A tingling paralysis seized him. Sudden sweat chilled him. For a moment he couldn't move, or speak, or even breathe. Because the moving thing was one of the Invaders.

That was his first shocking apprehension. His fevered imagination tried to turn the furtive shadow he had glimpsed, into something that used a sloping ramp instead of steps, something that could reach a handrail far too high for a man.

"Ann!" He got back his breath, and whispered to her. She hadn't seen it. She didn't understand, but now that icy paralysis was broken. He caught her glove and pulled her flat on the rusty platform, close to the little car.

"What is it?" she gasped.

"Thought it was one of the Invaders." He made a weak little laugh, at his own alarm. "Stupid of me, because it's hiding on that terrene dock. Gave me quite a jolt. S'pose it's just a man."

Perhaps, he thought fleetingly, there was little reason for his belief. Such men as Franz von Falkenberg were deadly as anything he knew. But he was used to dealing with men, and he couldn't even imagine anything to fit the doors and ramps and railings that the Invaders must have used.

"Cut off your light," he whispered.

He snapped off his own, and rose cautiously. It gave him a cold, lonely unease to be thus cut off from Ann. He was glad to feel her glove touch his armored sleeve. For a moment the pit seemed utterly dark, save for the stars beyond the valve. Then another red point came out, nearer, trembling with transmitted speech.

"Ann?" The voice was a gentle drawl. "Ann O'Banion?"

Her own helmet light flashed on again.

"Cap'n Rob?" she cried breathlessly. "It's really you?"

She lifted away from the platform. Anders snapped on his own head lamp, and soared after her. She dropped to that higher dock, where Rob McGee was waiting. Stubby in his silvered armor, the little spaceman seemed hardly as tall as Ann. He waddled nimbly to meet her, and reached out his gloves. Through his thick lens, Anders had a glimpse of his square leathery face, his squinted eyes bright with tears of joy.

This platform, Anders saw, was like the one they had left. The spiral footway slanted over it, with another oddly narrow landing from which the tall Invaders must have watched the terrene machines they had built but must not touch. Two narrow rusty railways ran back across the platform, through a broad doorway into the dark.

Anders dropped watchfully to the other end of the dock, beyond the little railways. He saw that McGee wore an antique space pistol, snapped to his belt. Anders leveled his own spatial automatic.

"H'lo, McGee," he said curtly. "Keep your hands where they are. Let me take your gun."

The little spaceman didn't move.

"Paul, what do you mean?" Ann protested sharply.

"Arresting McGee." His voice was clipped and flat. "Precautionary measure. Y'see, the circumstantial evidence looks a little queer. Dead men everywhere, and that Martian derelict. Have to take the gun."

Alertly, he started walking forward. The stiff armor made walking laborious, but he liked a solid footing in emergencies. McGee watched silently, until he came to the narrow railways across the platform.

"Wait, captain." The gentle drawling voice was almost apologetic. "Better not touch those rails."

Anders jerked back his descending foot.

"What's the matter with them?"

"Charged," McGee said softly. "Power for the cars. You see, the Invaders never touched them anyhow, so they didn't have to shield them. Two of the Jovians died that way."

Anders peered through the lens, at his seamed square face.

"Sorry, McGee," he said skeptically. "Better think of something else. 'Cause I don't fall for that one. Isn't feasible to carry current on a bare rail, in this vacuum. Y'need air for insulation. Too much loss."

"Not for the Invaders," McGee protested quietly. "You see, captain, they were experts at power transmission. They have power equipment, down inside, that's a thousand years ahead of us."

The Earthman stepped back, with a shaken laugh. His foot had almost touched that harmless-looking rail, and he remembered that he had been about to walk the tracks through the doorway from the other platform, before McGee appeared.

"Thanks, McGee." His voice came husky and weak. "I'll remember that. But still I'll have to keep you under arrest, till I find what all has happened here." His voice turned hard again. "Ann, will you bring me his gun?"

Silently, she unsnapped the ancient little weapon from McGee's belt, and soared over the little railways to hand it to Anders, and silently returned to stand by McGee. The stubby little spaceman merely stood there, waiting.

"Well, McGee?" Anders rapped impatiently. "Got anything to say?"

"Not to you, captain," McGee said gently.

"But he didn't kill anybody!" Ann's brown face was taut, behind the oval lens, and her voice flared out angrily. "Not unless it was in self-defense. Did you, Cap'n Rob?"

"Not even in self-defense," drawled McGee. "They were all hunting me, but I didn't have to kill them. Because you see, captain, in one way or another they all killed themselves."

"P'raps." Anders was doubtful. "But what do you claim you've been up to, McGee, skulking about in the dark with a gun?"

Beyond his lens, McGee's seamed leathery face was stubbornly set. Seeing that he didn't mean to answer, Anders moved a little forward, stopping short of the deadly railways.

"Listen, McGee." He tried to be persuasive. "I don't intend to be unjust. It's only my

duty, as an officer of the High Space Guard, to investigate the death of these men. If you can satisfy me that you're free of any criminal responsibility, I'll release you. 'Specially since you spoke about the railways."

"Better tell him, Cap'n Rob," Ann advised quietly.

McGee stared at Anders for long seconds, silently.

"You see, captain," he began at last, "they followed me here from Pallasport. Their ship looked like a Martian. I thought it was von Falkenberg, because he had robbed us before. But I was mistaken."

'Then who was it?" Anders demanded.

"Jovians." McGee's voice was very deliberate and gentle. "Spies and engineers from the Jovian Soviet, who had been sent to the Mandate to join the battle for seetee. Their cruiser was disguised—to keep their government out of trouble for breaking the treaty, if they were sighted. It had flat, Martian-type turrets."

"Eh!" Anders nodded quickly, in the helmet. "So it wasn't von Falkenberg at all? That accounts for the made-on-Europa armor. But go ahead, McGee."

"I had been here twenty-one hours, when they came," the little spaceman went on softly. "I had already cut loose a seetee bedplate and attached it to the hull of the *Jane*, to carry it back to the Drakes on Freedonia. The Jovians hailed me in German, and began firing when I wouldn't surrender."

"We heard your call to Freedonia," Anders told him. "But what happened to your ship?"

"The little *Jane* wasn't armed or camouflaged," McGee said sadly. "We couldn't fight, and we couldn't get away. We just hid behind the machine. That gave me time to make that call—they had fired from four hundred kilometers."

His squinted eyes peered solemnly through the lens.

"Then I had to leave the *Jane*," his soft drawl continued. "You see, I had welded the stem of that bedplate to the hull. I knew what would happen, if they hit it. I just had time to get inside this valve, before they made a hit. The bedplate went off like a thousand tons of tritonite. There was nothing left."

"Oh!" Ann made a hurt little gasp. "The poor little *Jane!*"

"I was sorry to lose her," said McGee. "We'd had her so long, she seemed almost alive. Never was a stancher little ship."

Anders peered at him, wonderingly.

"You mean you've been five days in that armor?"

McGee shrugged a tight roll of silvered fabric strapped above the battery pack on his armored shoulders.

"I brought an air balloon," he said gently. "I inflate that, when I have to eat or sleep. I had a few bars of space rations, and the air unit condenses water enough. I took fresh batteries off a dead Jovian."

"But you've been marooned, in this dreadful place?" Ann's voice had a thin edge of horror. "With all those men trying to hunt you down?"

McGee nodded calmly.

"They saw me come in through the valve," he said. "They were trying to kill me, to keep the secret of the machine for the Jovian Soviet. But, you see, they didn't really understand it. That's why it killed them."

"Killed them?" Anders echoed sharply. "How?"

"One way and another," repeated McGee. "You saw the one holding the bedplate, and the one with his legs cut off—they were already dead when I found them. Two stepped on the power rails. Several must have gone down the ore chutes, and I saw one trip himself into an automatic furnace. But the most of them died down about the power generator. Because, when you don't understand, that's the most dangerous part of all."

"But you understand?"

McGee's square jaw set stubbornly again.

"See here, McGee." Anders took a persuasive tone. "Y'know I represent Interplanet. My orders are to get seetee for my employers. I intend to be just. But, naturally, I'm going to take possession of this machine, for the Interplanet."

McGee didn't speak, but Ann flared back:

"Do you call that justice?"

"It's my duty," Anders said. "But I have full authority, and I can promise that Interplanet will be generous. I admit you have a valid claim, McGee, as first discoverer. You can set your own price on that, and I'll see you're paid."

McGee merely shook his head.

"Seems you know quite a lot about this machine." Anders peered keenly into his unyielding face. "Maybe you know what it was built for? Maybe you've found out how those

bedplates work? I'll give you a contract, if you can tell me that."

McGee said quietly, "I'm not working for Interplanet."

"Then I'll talk to Karen Hood, when we get back to Pallasport," Anders told him. "She's got a business head, and I think she'll admit that Interplanet holds the aces. Understand, I don't mean to rob you. I'm just going to make the whole firm of Drake, McGee & Drake into billionaires—whether you like it or not."

He grinned at Ann's wrathful face.

"Now I think it's time to go." He touched his gun. "Come along, McGee."

Ann lifted toward the mighty valve.

"Come, Cap'n Rob." Her voice was relieved. "Let's get out of this dreadful place."

McGee hung back stubbornly, until Anders gestured with the gun. He lurched unwillingly off the platform. Watchfully, Anders followed him up through the valve. They paused on the lip of that immense cylinder.

The Earthman was glad to see the shining mist of stars again, changeless on the crystal black of space. He heard Ann draw a long breath, as if they had come out into fresh air from some musty dungeon.

"The *Challenge* is waiting, twenty kilometers off," he told them. "They're blacked out, and that's too far to see them. I'll call Commander Protopopov to show us a light—"

His voice dried up.

For little Rob McGee had pointed silently, and he saw the blacked-out cruiser. The camouflaged hull made a sharp silhouette against the glowing Galactic clouds of Sagittarius. He stared incredulously, but the trim lines of hull and rounded turrets, the four long guns, couldn't be mistaken.

"That fool Protopopov!" His voice was brittle with anger. "Not a kilometer off! When I expressly ordered him to keep a safe distance. Worried about us, I s'pose—and even sent a search party!"

For he saw the tiny shadow of a man in armor, flying swiftly across that mist of distant suns toward the cruiser's valves. He turned up his helmet photophone, and narrowed its beam, to reach the vessel.

"*Challenge* ahoy!" The red ray trembled with his impatient voice. "This is Captain Anders, returning. Show us a light, and ready the valves. . . . *Challenge* ahoy! . . . *Challenge* ahoy!"

But the black ship showed no light. Anders began to wonder uneasily if he had really seen that fleeting figure, returning to the valves. He wondered if the proud *Challenge* could be already another derelict, a second vessel sucked of life by this ancient dead machine.

He gripped his automatic harder, and glanced sharply aside at Rob McGee. For it struck him suddenly that the odd little spaceman had seemed curiously indifferent about departing, for a rescued maroon, and it was pretty clear that he knew much more than he had told.

Anxiously he called again, "*Challenge* ahoy!"

And now the *Challenge* answered. The ship's powerful photophone transmitter glared like an angry red eye from the pointed bow, trembling with the vibrations of Protopopov's croaking whisper:

"What do you want?"

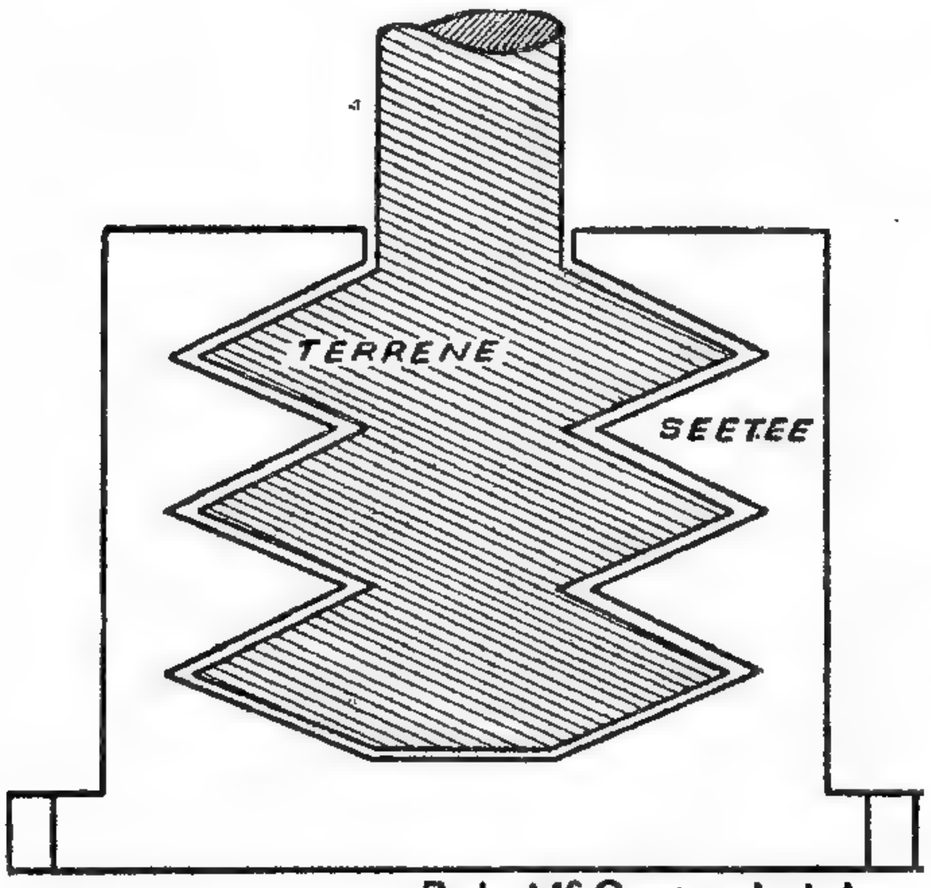
"This is Captain Anders." He tried not to sound too curt. "Show us a light and ready the valves. We're returning aboard."

For a moment the red eye was still.

"Unfortunately, you're mistaken," came the hoarse reply. "Because very regrettable exigencies make it impossible for us to obey your orders any further, Captain Anders. My fellow officers join me in offering our deepest apologies. But you can't return to the ship."

"You—" Anders choked. "This is mutiny, treason!"

"Exactly, captain," came the hollow rasping croak. "We shall inform your superior officers that you lost your head over an asterite girl spy, and attempted to betray the *Chal-*



Rob. McGee's sketch

lenge to a ring of Free Space revolutionists."

The husky moronic whisper brightened with invention.

"I shall report to Commissioner Hood that you were aiding them by stealing military information from the confidential files of Interplanet. I shall add the warning that the Free Space Party is plotting to attack the Mandate, with seetee weapons manufactured on Freedonia."

"Commander, you can't get away with that!" Anders protested desperately. "Are you crazy? Listen to reason, man—you'll be shot for this. Let me talk to Muratori. Give me Omura!"

The red glaring eye didn't answer.

"Think what you're doing, Protopopov—"

"So that's the name he uses?" little Rob McGee interrupted calmly. "I've met that man before, Captain Anders, and I know that undertaker's whisper. He's got another name, besides Protopopov. That's Franz von Falkenberg!"

Back from the drifting ship, the red beam brought a bubbling chuckle. For the ship's delicate receiver must have picked up McGee's interruption.

"And what do you think of that, my so-clever captain?" The croaking whisper turned sardonic. "Now you may as well know that Muratori and Omura are also friends of Mars. The most of your brave crew have already sworn the oath of allegiance to the Reich—and the witless few who refused are dead."

The red light shuddered again, to that hollow chuckle.

"Aren't you even clever enough," inquired that triumphant whisper, "to see the trend of history? Can't you see, my brilliant captain, that the rich old empire of Interplanet is falling to ruin of its own dead weight? Don't you see that the Mandate is only a feeble prop? Can't you perceive that the time is ripe for a new interstellar empire, to be conquered with seetee?"

That strange laugh bubbled again.

"Farewell, my clever captain," the red beam croaked. "We must leave you now, to reflect upon the cycles of empire."

The burning eye winked out.

"Moment, commander." The Earthman's voice turned brittle again. "If the Martian Reich means to conquer with seetee, you're just about six months late. Because the spatial engineering firm of Drake, McGee & Drake already has a successful seetee hammer in operation on Freedonia—that they built for Interplanet."

Ann made a stifled cry of hurt protest.

"Thanks," the red beam whispered back. "But we'll take care of that."

The burning eye went out again, and Anders saw the long spatial rifles of the *Challenge* swinging swiftly down against the white mist of stars. He snatched desperately for the neck straps of Ann and little McGee, and hauled them down through the open valve.

At this close range, he knew, the shells would be only a fractional second on the way. He tried to push Ann and McGee ahead of him, for this stupid blunder had been no fault of theirs. Then the universe flamed red. The shells made no sound, but something tugged very gently at his helmet.

XIV.

The next thing that Anders distinctly knew, he was lying on his back on the upper terrene platform, inside that dark enormous cylinder. His neck felt stiff, and he didn't want to move his head. He felt dull throbbling all through his head, not quite pain.

He thought he was alone.

Without moving his head, he could see a broad window of open space, its crystal blackness splendid with the Galactic clouds of the Archer. Against that brilliant mist of suns, he distinguished the leaves of the immense valve above him, scarcely damaged by that unexpected salvo from the *Challenge*.

Nearer, straight above, he could see that queerly narrow winding footway, where the Invaders must have moved. He caught a faint gleam of starlight on the bright rail above it, a rail too high for things like men.

Once again he tried to picture them, the beings that must have walked that contra-terrene ramp. But he knew he never could —even the word "walk" must be wrong, he thought, because they had used no steps. He tried to abandon the effort, because he saw now that it was only a road to madness.

Still he didn't want to move his head. He supposed that he would die here, it didn't matter when. Von Falkenberg needn't even bother to make certain of his kill. Because half a billion kilometers of the spatial night could be counted on to finish anything the shells had left alive.

Anders wondered what had happened to

Ann and little McGee. He had tried to push them down to safety, but there was no predicting exactly what half a metric ton of detonating tritonite would do. And he couldn't even try to call them now, because his helmet light was dead.

What was left of them would stay here, he supposed, along with the frozen corpses of the Jovians and whatever strange dust the Invaders might have left. Their remains would only add another grim little chapter, to the machine's untold story of mystery and death.

He lay still, watching the ramp and the rail. If he were only quiet enough, he thought, one of the Invaders would soon come along. He wanted to see why it used no steps, and why it was so thin and tall.

Would it be clad in some strange armor? Or had the Invaders been less fragile and fatally volatile than men, really spacemen? His slow brain fumbled with that problem, and gave it up. Thinking was difficult.

Somehow, a gray fog was thickening in his head.

He lay there, staring up through the fog, watching the ramp and the rail. If he only waited long enough, one of the Invaders would come somehow along the narrow footway, holding somehow to that high rail.

But the fog grew thicker. He could hardly see through it. The throbbing in his head was fainter now, not even sharp enough to keep him awake. He was suddenly afraid that he would sleep, before the tall Invader came.

Then he saw it.

The thing was bending over him, a vague blur in the fog. He knew it must be tall and narrow. He knew its contraterrene touch meant death. But he didn't want to move his head, and there was nothing he could do.

He couldn't see it, through the fog. But it was beside him, down on the terrene platform. It began fumbling with his armor. The strange touch of it made light, and he waited to die.

But the light was not blue annihilating fire. It was only the glow of his helmet light turned on. It showed the figure bending over him. He saw, with a weak, immense relief, that the thing was Ann O'Banion.

She closed the battery case under his shoulders, and did something to the controls on the breast of his armor. The air unit began to hum again. The air was suddenly good to breathe. He hadn't realized how stale it was. Immediately he felt stronger. The throbbing was gone from his head, and he tried to sit up.

"Better lie still," she advised. "You were almost asphyxiated."

"You—" His voice was disconcertingly inaudible, and he tried again. "You are all right?"

"Yes, you pushed us out of the way," she told him. "You were the only casualty. Caught a shell splinter against your back. Only knocked you out—it didn't penetrate. But it ruined your battery pack. You were nearly dead before Cap'n Rob could salvage another, from the Jovian on the other platform."

It was good to breathe. The gray fog was clearing, but still Anders didn't want to move. He just lay there for a time, looking up through the lenses at her face. He liked the curve of her tanned cheek, and the tilt of her freckled nose.

He tried to speak again.

"Ann—" Her gray eyes, looking down at him, were clear and kind and honest. She waited, but he couldn't go on. Speech was still too difficult, and something choked him. "I'm just glad—that you're all right."

She smiled a little, but her kind eyes stayed dark and solemn. She adjusted the air unit again, and then helped him sit up against the great curving wall. The gray fog was gone.

"Thanks, beautiful." He grinned feebly. "Have I been out long?"

"A dreadful time." She looked at her watch. "Must be four hours. I was afraid we couldn't help you, till Cap'n Rob brought the batteries."

"Where's von Falkenberg?" he whispered anxiously. "With the *Challenge?*"

"Gone." Her voice turned flat. "They just fired that one salvo. Cap'n Rob looked out, afterward. He saw them welding a seetee bedplate to the hull—one they had cut out, to take back to their lab. Then they left, at full acceleration."

Staring at him with dark, strange eyes, she added:

"They were headed straight for Freedonia."

"Thought they would," Anders said.

"Now von Falkenberg will try to wreck the hammer and the shops, and everything we have on Freedonia." Her low voice was bitter, almost accusing. "Old Jim Drake and Rick will probably be killed. They don't even have a ship. They haven't got a chance."

Would you give less than 7¢ a day for Music Lessons?

Yes! That's all it costs!

Amazing Print and Picture Method Teaches Thousands to Play in Their Own Homes

THINK of it! For just about the few pennies you spend for your daily newspapers, YOU CAN LEARN MUSIC! You can learn to play your favorite musical instrument, *Any* instrument—piano, saxophone, violin, guitar, accordion, etc. What's more, you can learn right in your own home, in spare time!

Actually, your music lessons cost less than 7c a day. And that includes *everything*—instruction, sheet music, personal Advisory Service. No extras of any kind, nothing more to pay.

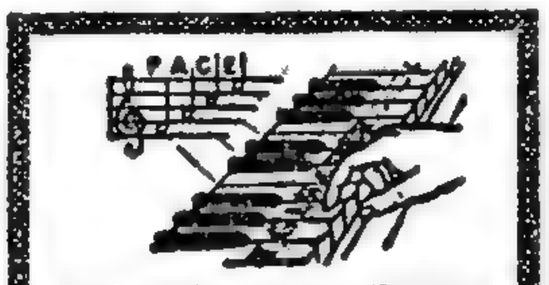
Didn't Dream She Could Learn So Quickly!

"I DIDN'T dream I could actually learn to play without a teacher. . . . I had always heard it couldn't be done. You can imagine my surprise when after 3 or 4 weeks I found I could play real tunes. Now when I play people will hardly believe that I learned to play so well in so short a time. Any person who takes your piano course and studies it cannot help but learn to play."—**H. C. S., California.*

Easy as A-B-C

No hum-drum scales or exercises, either. You start playing real tunes—from the *very first lesson.* YOU LEARN TO PLAY BY PLAYING. Every move is clearly shown in charts and illustrations—with accompanying text to lead you easily from one step to another. And what a thrill to hear yourself actually playing popular songs and classical selections! What a surprise for your friends!

Find out about this easy, money-saving method at once. If you want to learn music but are hesitating because you may be drafted, we have made special provisions for those who are called. Mail coupon below for illustrated free booklet giving complete information on how you can learn to play any instrument in your own home. Free print and picture sample included. Instruments supplied when needed, cash or credit. **U. S. School of Music, 3591 Brunswick Bldg., New York City.** (Forty-Fifth year. Established 1898.)



Look at these notes—they are F-A-C-E. Simple, isn't it? You are already learning to read music. It's easy to play, too. A new invention, the "Note-Finder," locates each note for you on the keyboard.

FOUND ACCORDION EASY

"I've always wanted to play the piano accordion," writes **H. E. from Canada.* "But thought I'd never learn it. Then I read about your lessons. I don't know how to express my satisfaction."

AMAZED FRIENDS

"This course has been very interesting. Words cannot express how I have enjoyed it. My friends seem very much pleased with my playing; they can hardly believe I learned without a teacher."—**E. G., Atlanta, Ga.*

Music is the magic key to friendship, fun, romance. The person who can play a musical instrument is always sure of a welcome. Why not let music open the door for you to a happier, richer life? Mail the coupon and find out how easily and inexpensively you can learn at home.

Send for FREE Print and Picture Sample

U. S. School of Music, 3591 Brunswick Bldg., New York, N. Y.
I am interested in music study, particularly in the instrument checked below. Please send me your free illustrated booklet, "How to Learn Music at Home," and Free Print and Picture Sample.

Piano	Hawaiian Guitar	Trombone	Drums and Traps
Violin		Cornet	Ukulele
Guitar	Tenor Banjo	Trumpet	Organ
Piano Accordion	Mandolin	Flute	Harmony and Composition
Saxophone		Piccolo	

Have You Instrument?.....

Name.....

Address .....

City..... *State*.....

NOTE: If you are under 16 years of age, parent must sign this coupon.

SAVE 2c STICK COUPON ON PENNY POSTCARD

**Actual pupils' names on request. Pictures by Professional Models.*

ANY PHOTO ENLARGED

Size 8 x 10 inches or smaller if desired. Same price for full length or bust form, groups, landscapes, pet animals, etc., or enlargements of any part of group picture. Safe return of original photo guaranteed. **47c** **3 for $1.00**

SEND NO MONEY Just mail photo or snapshot (any size) and receive promptly your beautiful enlargement, guaranteed fadeless. Pay postman 47c plus postage—or send 49c with order and we pay postage. **Big 16x20-inch enlargement** sent C. O. D. 78c plus postage or send 80c and we pay postage. Take advantage of this amazing offer now. Send your photos today. Specify size wanted.
STANDARD ART STUDIOS, 100 East Ohio St., Dept. 773-A, Chicago

3 in 1 RADIO TUNER

Only $1.00 Postpaid
1. **Aerial Eliminator**
2. **Antenna Tuner**
3. **Wave Trap**

Eliminates hums, clicks, static caused by electrical appliances, rain, wind, etc. Replaces old, ineffective outside aerials. Move your radio anywhere. The 3 in 1 improves the reception of weak stations, separates interfering stations, gives you greater volume and distance. Uses no power, lasts life of radio. Also works on battery radios. Takes minute to connect. 5 DAY FREE TRIAL. SEND NO MONEY. Simply pay Postman $1.00 plus few cents postage or we will send postpaid for one dollar bill. Vogue Eliminator Co., 7759 S. Halsted, Dept. E-158, Chicago. **AGENTS WANTED.**

Learn To MOUNT BIRDS

Tan SKINS, Make Up FURS
Be a Taxidermist. *Double your hunting fun.* We teach you at **Home.** Mount **Birds, Animals, Pets, Heads** and **Fish.** Save your hunting trophies; decorate home and den. **MAKE MONEY.** Mount and Krome-tan for others. Big spare-time profits. **INVESTIGATE TODAY.**
FREE BOOK with 100 game pictures. 48 pages. Hunters, get yours! It's **Now Free.** Send postal card **TODAY — This Minute!** State your **AGE.**
NORTHWESTERN SCHOOL OF TAXIDERMY; Dept. 1411, Omaha, Nebr.

SUPER JU JITSU

NOW GET TOUGH DOUBLE-QUICK!

Learn how YOU can be dangerous. Lick brutes twice your size *with only your bare hands*, even when they are armed. This powerful fighting system is unbelievably efficient. You don't need ox-like muscles — it's brains that count! New, easy self-study course at amazing low price. Free-trial offer and money-back guarantee. Hurry! Write today for FREE DETAILS. Nelson Co., 500 Sherman, Dept. B-506, Chicago.

LAW **STUDY AT HOME**
Legally trained men win higher positions and bigger success in business and public life. Greater opportunities now than ever before. Big corporations are headed by men with legal training.
More Ability: More Prestige: More Money
We guide you step by step. You can train at home during spare time. Degree of LL. B. Successful graduates in every section of the U. S. We furnish all text material, including 14-volume Law Library. Low cost, easy terms. Get our valuable 48-page "Law Training for Leadership" and "Evidence" books FREE. Send for them NOW.
LaSalle Extension University, Dept. 165-L, Chicago
A Correspondence Institution

"Sorry, beautiful," Anders said.

"You ought to be," she told him solemnly. "Because I know the Drakes would have given their work to the Mandate, to stop the Martians. We had agreed on that. But now the Martians will have seetee."

She made a tired, hopeless gesture.

"Now there's nothing that can stop them, not since you gave the Drakes away. Seetee can smash the Mandate, and overrun the planets. The Martian Reich will be worse than Interplanet ever was."

Anders met her bitter eyes.

"'Fraid of that, beautiful. Von Falkenberg said I wasn't very clever, and seems I haven't been." He shrugged, in the silver armor. "But there's no use to talk about it now."

Ann nodded gravely, beyond the lens.

"No use," she agreed. "We'll never know what happens. Even if von Falkenberg comes back with another expedition, to look for more loot for Mars, he'll find us as dead as the Invaders."

She glanced up at the winding empty footway where the seetee things had moved, with its railing too high for men to reach; at the landing where they must have stood, too narrow for the feet of men. He saw that she shivered.

"Where's McGee?" he asked suddenly.

"Cap'n Rob went down inside again." Her eyes dropped to the black yawning doorway, where the deadly little railways ran off the platform. Her tired voice had an edge of horror.

"What's he doing?"

"Looking for more batteries," she said. "He thought there must be some with charge left in them, on the Jovians who died down inside. He thought there might be enough to last a good many days."

"So that's the ending, gorgeous?" Anders gave her a bitter little grin. "We're marooned here, like McGee was, half a billion kilometers from the nearest planet. Not a chance to get away, or even call for help. We just go out, with the last of the Jovians' batteries?"

Her tired head nodded, in the big helmet.

"That's the ending, Paul."

He sat there a long time, just looking through the lenses at the childlike graveness of her face. He wanted very much to help her, and he was feeling stronger now. But there was nothing left that human strength could do.

"Sorry," he said. "Sorry for you, and for poor little McGee. Don't think I really mind quite so much, about myself. After all, gorgeous, I wasn't really very proud of that job Hood gave me."

"I knew you weren't."

"Then you'll try to understand?" he whispered anxiously. "Understand that I had to try my best to do it, even if I didn't like it much? Just because I was an Earthman and an Interplanet engineer?"

She put her glove in his.

"I understand," she said.

"Thanks." He squeezed her armored hand. "Now I s'pose we can be friends—now when nothing matters any more." He grinned at her. "But you were a pleasant enemy, beautiful."

"I'd rather be friends," she said.

He could see the sober little smile on her brown childish face, lifting the firm curve of her lips. He thought he would like to kiss her, but for the two hard plates of leaded glass between.

They sat there on the dark platform. Anders still felt stronger. But he knew that any movement or exertion would drain vital current from the batteries, minutes and hours from their lives.

Ann didn't speak. He began to feel that he could hear the silence of the dead Invaders. It was a heavy, oppressive stillness, that had endured since men were scarcely men. It became a smothering, dreadful thing, more terrible than sound.

He saw that Ann was watching the empty curve of that ramp and railing, with a dark terror in her eyes. He found that he was watching, too. They were waiting for the beings that had moved along that narrow, stepless footway, and used those railings above the reach of men.

He sat up, suddenly.

For he knew that only madness would ever walk those empty ramps again. The Invaders were dead. He wanted desperately to hear the warm sound of Ann's voice, even though the photophone current might be draining away their lives.

"You must have had time to talk to McGee?" He looked at her, keenly. "Does he know anything about the Invaders—and what this machine was for?"

She stared for a moment through that broad doorway, where the harmless-seeming little railways ran into the machine's chasm of dead silent darkness. Anders thought she shivered.

"They weren't men," she whispered. "Cap'n Rob says you can tell that from the things they built. They must have been very tall, and they couldn't climb steps, and none of their tools would be right for human hands—even if men could ever touch them."

"Are there any skeletons?"

"Cap'n Rob didn't find any," she said. "He thinks maybe they all left the machine, at the last. Or maybe they just didn't have skeletons. Cap'n Rob doesn't know what they looked like, but he says he understands them."

Her eyes lifted to that narrow winding footway, where once those contraterrene things had moved. She followed the gleam of the stars on that too-high railing, that it was death for a man to touch.

"Cap'n Rob must have had a pretty terrible time, at first." Her low voice shivered again. "Marooned here, and hiding from the Jovians, and watching them die because they didn't understand the machine.

"He doesn't like to talk about it. You know he's very sensitive, under that calm look of his, and he never talks very much. But we've been good friends, since I was just a little girl. He told me a good deal, while we were waiting.

"It was bad at first, he said. But pretty soon he began to understand the machine and the beings that made it. Then there wasn't very much danger to him any longer, because he had begun to feel at home."

Anders caught his breath. For the machine had become a living enemy to him, deadly and treacherous, colossal and inscrutable and implacable. It had trapped and destroyed a whole ship's company of fighting spacemen and engineers. But little Rob McGee, quiet and mild and insignificant in his stubby armor, had said he felt at home!

"You know about his gift?" Ann went on. "How he always knows the time? How he could tell Rick the position and the mass of this machine, before he had ever seen it?"

Anders nodded, with a remembered awe.

"Cap'n Rob hates that gift," her quiet voice continued. "Because it sets him apart from men. It makes him so terribly lonely. Perhaps he really is a mutant—though that's a dreadful word. Because he has told me that human beings always seem a little strange, and hard for him to understand.

"But I think that gift is what saved his life, when the Jovian engineers were blundering into death all around him. Because he could always understand any machine, with just a glance. And he told me he knew the Invaders, just from their machines. They loved the beauty of mathematics, he said, because it is in all the things they made. Then he gave that apologetic little laugh of his, and said the Invaders were more rational than men."

"Then McGee knows what this thing was?" Anders sat straighter again, and his voice had a brittle ring of excitement. In the dim ruddy glow of his helmet light, he searched Ann's solemn face. "Did he tell you that?"

Her eyes were thoughtful, very grave.

"Cap'n Rob was talking just to me. But I suppose it's all right for me to tell you. now that we aren't enemies. Give me your word of honor, that you're through with Interplanet?"

"Word of honor, beautiful." Anders grinned. "If you think that matters now. And what was the machine?"

"A power plant," she said.

"Eh?" He gulped a startled breath. "Power?"

"They burned terrene matter, against seetee."

"Now I get it!" He stared down across the vast starlit cylinder, at the dim mass of that mighty cradle where a terrene ship had rested; at the dark yawning ore chutes, with their unseen bond-dissolving screens, that had received the terrene cargo.

"Now I see!" he whispered. "They scooped up terrene meteors and such, to be dumped in those chutes. S'pose they shipped seetee stuff from their own planet, to the other end of the machine?"

"That's what Cap'n Rob says."

"That's power!" he exclaimed. "Our U-235 is no more than just a treadmill, compared to that. Use any elements for fuel, and the reaction is complete. But how did they use it, way out at space?"

"Cap'n Rob says they were experts, at power transmission," the girl said. "You remember those five golden spikes—one of them broken off? Those were the terminals of their transmitter. He says they had receivers, on their spaceships and in the cities on their planet, tuned to pick it up."

"Wireless transmission!" Anders was breathless. "What we've been dreaming of, for two hundred years. Y'know, beautiful, this machine could be the best thing that ever happened to the human race!"

"Or the worst," she reminded him soberly, "if the Martians get it."

He nodded, silent for a time.

"Too bad we failed," he said at last. "'Cause y'see, beautiful, the big reason for all the conflict and rivalry between the planets—even for the war the Martians want to start—is the coming shortage of uranium. Never really plentiful. When you find it, only one part in two hundred is the power isotope. And even pure U-235 doesn't give you the complete efficiency of the seetee reaction."

An excitement grew, in his thoughtful voice.

"The Mandate was really set up for a kind of umpire, to keep the planets from fighting over the depleted deposits that are left. So far, it has kept a kind of uncertain peace. But seetee—in the right hands—could provide power to end all the famine and the fear and the struggle."

Ann smiled faintly, beyond the thick lens.

"Now you're talking like old Jim Drake, when men used to call him Seetee Drake," she said. "That's the way we always planned to use seetee—to make an end of crooked politics in the Mandate, and turn it into the basis of a real democratic union of the planets."

"Could be done," Anders said.

"But it won't be." She shook her tired head. "Not by the Martian Reich."

Anders leaned wearily back against the tall rusted wall. For a time they were silent, thoughtful. Once again his eyes lifted to the narrow empty ramps of the Invaders, where men could never step.

"Wonder what their history was," he said at last. "McGee learn anything?"

"Of course they must have come from a seetee system," Ann told him. "Cap'n Rob said he hadn't found anything that looked like books or records or even any marks on their machines—maybe they didn't need to write. But he told me what he had surmised about them."

"Let's have it," Anders urged.

Their photophone cells were dim, to save the precious current. Ancient shadows seemed to creep and thicken, all about the platform. Watching that narrow empty footway, as he listened, Anders tried to imagine something moving there—something that didn't walk, taller than a man, and queerly thin.

"Cap'n Rob says there was some other dis-

aster," her grave low voice began. "Something hurled the Invader—the planet, I mean —out of its native seetee system. Perhaps some passing star pulled it off its orbit.

"The Invaders, anyhow—now I mean the people—must have had a high culture, already. If they hadn't, they'd all have frozen to death. Because the planet must have wandered in interstellar space for thousands or maybe millions of years, without any sun.

"Cap'n Rob thinks that is when they built the machine—when they saw they were going to be thrown off into space—to give them atomic heat and power during that endless dreadful night.

"Because the machine seems very old—all the terrene parts, that were hard for them to polish and repair. That's why half of it's so rusty. Cap'n Rob thinks they must have kept it running for hundreds of thousands of year, at least.

"Finally, more than eighty-seven thousand years ago, their dark wandering planet came into our system. It collided with the trans-Martian planet. The fragments made our minor planets, and the seetee drift. The Invaders managed to save their power plant, but not themselves."

Her low voice faded into ancient silence. By the dim red glow of his helmet light, Anders could see her tired wondering face. She, too, was staring at that empty ramp, where the tall Invaders once had moved.

"What happened to them?" His voice was deeply puzzled. "With all their science. they should have been able to predict the collision, years ahead. Why, with the power from this machine, you could deflect even a planet enough to prevent collision!"

She nodded soberly, in the dim helmet.

"That's what Cap'n Rob said. He doesn't know what happened. Only the machinery looks as if it had been neglected, toward the end. The collector ships are lost, and the fuel in most of the bins is running low. That broken transmitter tower was never repaired.

"And Cap'n Rob thinks they weren't expecting the collision, because the machine was still dangerously near when it happened. The reaction of its drive field against the fragments was what enabled him to find it, you know. He thinks perhaps they were still so close that the radiation killed the crew.

"Of course they couldn't tell whether our system was going to be terrene or seetee, till they got here. Cap'n Rob thinks maybe they just forgot the difference. He thinks they must have tried to migrate to our planets, in the old spaceships they still knew how to operate

The man who's conservation-wise
Says Thin Gillette's the blade he buys!
It's thrifty, longer-lasting, keen—
You sure look slick—shave fast and clean!
THIN
Gillette
BLADES
4 for 10c
8 for 19c
12 for 27c
Produced By
The Maker Of
The Famous
Gillette Blue
Blade
Easy Way To Get Even
More Shaves With
Every Gillette Blade
1. WASH FACE thoroughly with hot water and soap to soften beard and eliminate accumulated grit that dulls shaving edges
2. APPLY LATHER or Brushless Shaving Cream while face is wet. If lather is used, dip your brush in water frequently
3. TWO EDGES double blade life. Marks indicated above identify edges, enabling you to give both equal use and get extra shaves
4. CLEAN BLADE in razor by loosening handle, then rinsing in hot water and shaking. Wiping the blade is likely to damage the edges

BECOME AN EXPERT

BOOKKEEPER

New, *better* bookkeeping opportunities opening every day. Jobs that pay well—and lead to still better jobs. We train you to get them—and keep them! Previous training not necessary. C.P.A. instructors cover everything from the ground up. Inexpensive. Write for free book and special terms. No obligation. Address:

LaSalle Extension University, Dept. 165-H Chicago, Ill.
A Correspondence Institution

High School Course at Home **Many Finish in 2 Years**

Go as rapidly as your time and abilities permit. Course equivalent to resident school work—prepares for college entrance exams. Standard H.S. texts supplied. Diploma. Credit for H. S. subjects already completed. Single subjects if desired. High school education is very important for advancement in business and industry and socially. Don't be handicapped all your life. Be a High School graduate. Start your training now. Free Bulletin on request. No obligation.

American School, Dpt. H17 Drexel at 58th, Chicago

HOSPITAL BILLS PAID

For Only a Few Pennies a Day

How would you like to have Hospital or Doctor bills paid for yourself or your family? Thousands will tell you the genuine Prudence Policy is foremost—it's the most complete **HOSPITAL AND SURGEON'S FEE INSURANCE** offered. Liberal Policy pays up to $485.00 for Hospitalization. Covers SICKNESS or INJURY, many other liberal benefits! WAR RISK included. Send for literature at once. No Agent will call. Write today! **PRUDENCE,** ***Pioneers of Hospitalization Insurance,*** **1750 Old Colony Bldg., Chicago, Ill.**

don't WORRY

ABOUT **RUPTURE**

Why put up with years of needless discomfort and worry? Try a Brooks Automatic Air Cushion. This marvelous appliance permits the opening to close, yet holds reducible rupture securely, comfortably—day and night. Thousands report amazing results. Light, neat-fitting. No hard pads or stiff springs to chafe or gouge. Made for men, women and children. Durable, cheap, **Sent on trial** to prove it. Never sold in stores. Beware of imitations. Write for Free Book on Rupture, no-risk trial order plan, and proof of results. All correspondence confidential.
BROOKS COMPANY, 108-B State St., Marshall, Mich.

—and just burned up when they touched the atmosphere."

Beyond the pale red glow of their helmet lights, the dark seemed denser. Anders looked up again at the empty contraterrene footway, and the queerly narrow landings, and the handrails too high for the hands of men.

"S'pose their culture just decayed," he suggested. "Died for want of contact, while they were out at space. No challenge. No conflict. No reaction of opposing forces. Must have been the machine itself that killed them—just because it worked too well."

Staring into the starlit dark, however, he was still unsatisfied. For all that hypothetical drama of their triumph and tragedy, the Invaders were still enigma. The fate of those tall beings that had used no steps was still a riddle, as baffling as the puzzle of their beginning, or their language, or their physical appearance. He knew it was no use to search their empty ramps and landings. They were sunk forever into the black eternal mystery of time and space.

"Oh—Paul!"

Ann frightened him, with that breathless little cry. She clutched his steel sleeve, with a gesture of panic—for she, too, must have been watching that empty footway. Anders snatched for his gun, and found that it was gone.

But the thing that came out of that broad black doorway, out of the deadly mysterious depths of the machine, was nothing thin or tall or terrible. It was only little Rob McGee, quiet and half apologetic, smiling a little at Ann with his mild squinted eyes.

"Oh, Cap'n Rob!" She drew a quick relieved breath, and then asked him anxiously, "Did you find any batteries?"

"No batteries." He shook his head, in the silvered helmet. "Ann, will you please come here? I've something to say to you." He looked at Anders, and his voice was gently apologetic. "If you will excuse us, captain."

Ann turned, with a puzzled manner. He gestured with his glove, into the black space from which he had come. She hesitated, with an apprehensive glance at Anders. But Rob McGee caught her armored hand. They lifted over the deadly little railways, and went back into the dark.

XV.

Anders turned his helmet light down to a faint red spark, to save the precious current.

He made himself sit very still, to stanch the drain of power through the air unit. Alone in the starlit cylinder, he waited for Ann and McGee.

He tried to keep his eyes off the insoluble riddle of the narrow winding footway and the too-high rail above it. Resolutely, he looked out through the open valve. But even the familiar stars were cold and distant company.

He couldn't help wondering whether Ann would come back. Perhaps little McGee had really found more charged batteries on the dead men, but not enough to share. After all, he reminded himself, he had been an enemy.

Grimly, he tried to tell himself that it didn't matter very much. But it did. He wanted Ann. She was a warm bright lamp, that kept back the thin ghastly ghosts of the dead Invaders, waiting in the dark to creep back along their old footway when these human intruders were gone.

"Paul!"

She called to him, and the red cheering glow of her helmet light swam back from the chasm of night, beyond that doorway. She was alone. She lifted over the little railways, and dropped beside him on the platform.

"Glad to see you, beautiful!"

He rose from where he had been sitting, propped against the rusty wall. He turned up his air unit and the helmet light. Fresh oxygen quickened his senses. In the light's stronger glow, he saw that her face was taut and pale.

"Paul—"

She whispered his name, and paused. Slowly, she came to him. Her gray eyes searched through his helmet lens.

" 'S'matter, beautiful?"

For a time she didn't speak.

"We aren't marooned." Her low anxious voice held no relief. "That was what Cap'n Rob wanted to tell me. He has a way to save our lives."

"Very int'resting." He touched the empty catch at his belt. "So that's why he took my gun? And now we're enemies again." He managed to grin at her tense face. "By-by, beautiful!"

"Paul!"

That was a hurt, breathless protest. She caught his gloved hand, which he had lifted in an ironic gesture of farewell, and held it tight in both her own. In the dim rosy light from his helmet, her face looked urgent and distressed.

" 'Sall right, darlin'," he told her cheerfully. "I know you can't very well do anything for me, now that we're enemies again. You don't want me reporting to Commissioner Hood, and turning this machine over to Interplanet, and throwing you into Pallas IV."

She made an angry little gulp.

"Fortunes of war, gorgeous." He pulled his glove out of hers. "Don't worry your pretty little head. Go right along and leave me. Don't expect any better than I gave."

"Please don't talk that way." His light glittered on her tears. "Please, Paul—you've already done your best for Interplanet. It isn't your fault you failed. But now—" She gulped, and blinked at the tears. "Can't you give up now?"

"So you're demanding my surrender, wonderful?" He grinned at her. "Maybe you'll even offer to accept my parole—my solemn word of honor, as an Interplanet engineer and an officer of the High Space Guard, never again to commit any hostile act against the sovereign firm of Drake, McGee & Drake?"

She nodded, not smiling.

"Will you, Paul—please?"

"What if I won't?" He looked past her, into the starlit dark. "S'pose then you'll leave me here, to watch that railing by myself? I can swallow a hundred miligrams of ametine, when my battery gives out. And von Falkenberg will find what's left, along with the dead Jovians and those empty walks, when he comes back to take possession."

He grinned at her bleak, taut face.

"Hard choice, darlin'!"

Ann tried to stamp her foot. The heavy silvered armor made the gesture awkward and childish and somehow pathetic. Beyond the lens, Anders saw angry tears burst into her dark troubled eyes.

"Beast!" she gasped. "You know we have to take you."

"I'm sorry, Ann." The grin was gone, and he felt tears in his own eyes. He stepped clumsily forward, and caught her gloves, and held them both. "I'm giving you that parole," he told her quietly. "I'm through with the Guard and Interplanet."

She caught her breath, voiceless.

" 'S'fact," he said. "And maybe sometime you'll let me go to work for Drake, McGee & Drake? How about that, gorgeous?"

She nodded, winking at her tears. Her taut brown face slowly relaxed into a smile.

Again he thought that her lips, beyond the two thick lenses, would be very nice to kiss. He put his arm impulsively around her, and grinned at the click of steel on steel.

"And how do we leave?"

She gulped. "In the *Jane*."

"But I thought—"

"Cap'n Rob hates to lie." She was smiling still, and her gloves clung to his. "But he can when he has to. You see, the Jovians really missed, when they fired on the *Jane*. Because Cap'n Rob saw the flash of their guns, and dived behind the machine. He had time to make that call to Freedonia, and then he hid the *Jane*."

"Eh! But where?"

"You'd never guess." Her gray eyes were beautiful and bright. "It's in the other cylinder, at the other end of the machine. That's another berth, like this, except everything's seetee. He knew the Jovians wouldn't follow him there."

"The *Jane* isn't seetee."

"Of course not," she said cheerfully. "But you see he already had that seetee bedplate welded to the hull, to bring it back to Freedonia. He just left the *Jane* anchored on that."

"Able man, Cap'n Rob!" Anders grinned. "Y'know, darlin', I think I'm going to like the whole firm of Drake, McGee & Drake—though with a natural preference for one of the silent partners."

They waited, standing out on the cylinder's rim. Anxiously, they watched the black splendor of star-frosted space, and at last they saw the little tug. It came flying around the ribbed curve of that enormous rusty dome. A meteor-blistered rectangular ingot, it looked tiny and ugly and sturdy as Rob McGee.

It dropped beside them. Anders looked for the bedplate that had been welded like a silver mushroom to the battered hull. But he found only the bright fresh mark of a cutting torch, high up the side.

The valve swung open, above the worn ground gear. The tall Earthman followed Ann up the accommodation steps. They shrugged and twisted out of their armor, and climbed the ladder well five decks to the pilothouse—for the *Good-by Jane* had no elevator.

Rob McGee was standing by the periscope, when Anders followed Ann into the tiny gray-walled room. His mildew-green space coat looked a little too large. He gave Ann a smile of silent welcome. Then his square face set, and he turned to Anders with calm disapproving eyes.

"But he's all right, Cap'n Rob," Ann protested.

"She means I'm resigning from Interplanet, and retiring from the Guard," Anders told him. "Hood won't like it much, but I'm an asterite now. And Ann has promised me a job."

"Now that's different." Nimble on small feet, McGee came and took his hand in a powerful grip. A quick smile of liking transformed his seamed leathery face, so it wasn't ugly any longer. "Welcome to the firm!"

One squinted eye winked at Ann.

"And we're going to need you, captain," McGee added soberly. "Because we've got quite a job, to beat the Martians to the conquest of seetee."

"A job we can't hope to do," Ann put in bitterly, "if von Falkenberg wrecks the shops on Freedonia." She looked at Anders, and he could see the burning accusation in her eyes. "And if he tries to murder the Drakes."

Anders turned away from her bleak, shadowed face. She still blamed him, he saw, for sending the Martian agent back to Freedonia. That fact was a barrier between them, more actual than steel and leaded glass had been.

He spoke to Rob McGee.

"Where's that bedplate, Cap'n Rob? Thought you were taking one back for a model? 'Magine we could take it apart, somehow. I'm willing to help."

"Thank you, captain." McGee made another leathery smile. "But we don't need it now, and I cut it off the hull. You see, while Ann was looking after you, I found the shops where the Invaders made those bedplates." He nodded toward the companion. "But if you're going to join the firm, I'll show you what I found."

Breathless, they followed him down to his tiny cabin. He fumbled under the bunk and hauled out something on the end of a rope. He towed it into the narrow wardroom, and tried to lay it on the table. Ann made a startled little cry. Anders merely stared.

It was a disk-shaped plate of smooth gray metal, nearly a meter in diameter. In the center was a ten-centimeter hole. Some five centimeters thick at the rim of that hole, it tapered to a few millimeters at the rounded edge. Nothing about it seemed extraordinary, except that it didn't touch the table.

"Why—" Ann gasped, "it floats!"

For the disk had suspended itself in the air, a dozen centimeters above the little table. It didn't touch the bulkhead beyond, and it didn't touch their bodies. When Ann reached gingerly out to touch it, it moved quickly back from her hand. The rope was tied through the hole, and Anders noticed that it stood out in a broad loop, not touching the metal anywhere.

"Push it down," McGee invited.

Anders and the breathless girl pressed with their hands. A yielding resistance opposed them. The disk moved toward the table top, but not all the way. Their hands didn't quite touch it, not even when they pushed with all their strength.

They let it bob up again.

"How come?" Anders whispered.

"Paragravity," McGee told him gently.

"Permanent negative paragravity." The tall Earthman caught his breath. "Something we've been looking for, the last hundred years! The phenomena of paragravity always seemed to lie between normal gravity and magnetism. The equations of the permanent negative field were written a hundred years ago. But we could never find an alloy to hold it."

"This is it," McGee said softly. "I looked at the furnaces, and the units where the disks were activated and assembled. I know the process. And the Drakes can analyze the alloy—if von Falkenberg has left us any lab."

Anders pushed the gray disk down again.

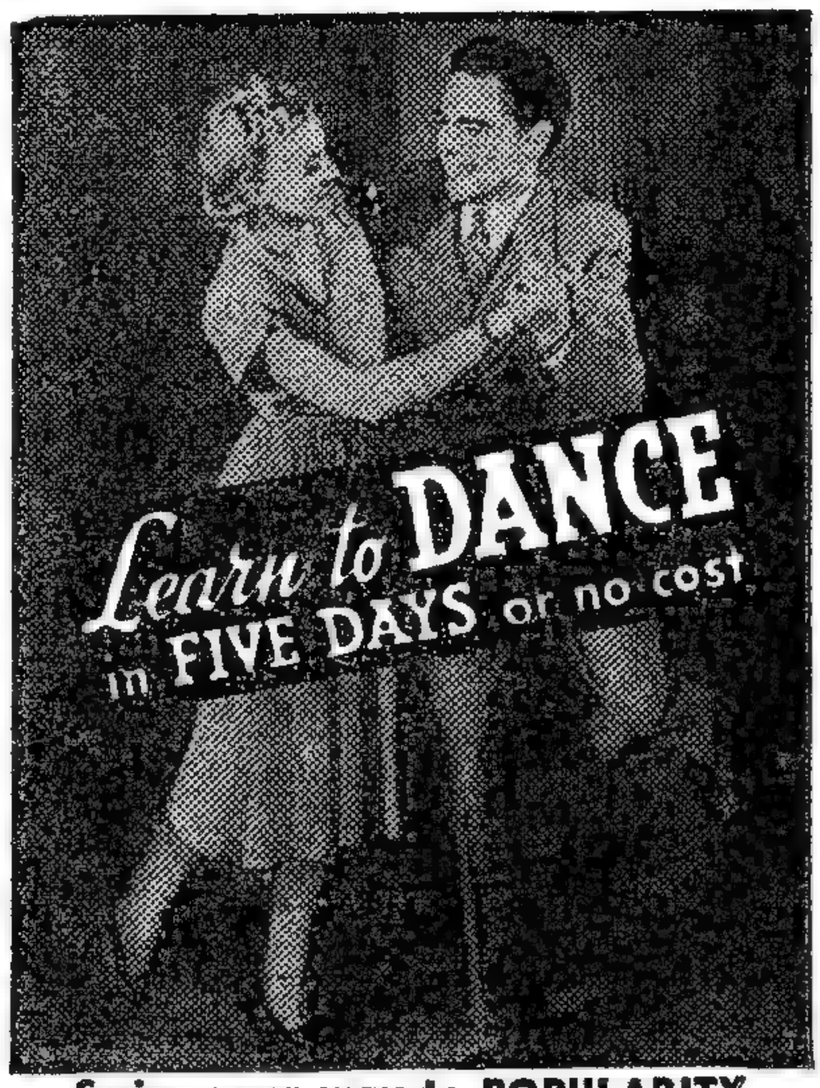
"Surface effect!" he exclaimed. "Obeys the inverse-square law. Half the distance, four times the repulsion. Means contact is darn near impossible—convenient, when you're going to set it against a seetee counter-disk! S'pose those bedplates are layer-cake affairs? Plates like this locked to the terrene stem, and seetee counter-plates fastened to the case?"

Nodding, McGee showed him a scrawled diagram.

"What a bearing metal!" Anders had reached again for the disk, and it slithered evasively out of his hands. "No contact means no friction. Explains why that machine ran on so long. Peegee fields just don't wear out!"

"I hadn't thought of that." McGee blinked his squinted eyes, and his square face smiled approvingly. "Yes, I think Drake, McGee & Drake are really going to need you, captain."

He anchored the skittish disk back under his bunk, and they climbed again to the square little pilothouse. With his face in the peri-



Swing your way to POPULARITY with the NEW DANCES

Whether you have ever danced before, or not . . . you will find it much easier with the help of these 3 books. Avoid embarrassment . . . learn to dance in the privacy of your own home. All the new Swing steps—the Rhumba, Susi-Q, Truckin', and Bomba, as well as the basic Fox Trot and Waltz and tap steps, are explained with simple, graphic diagrams, in "Dancing" and the *two* books we include FREE with each order.

GET MORE FUN OUT OF LIFE!

It is the person who can dance the new steps that gets invited to the dances and parties where Fun begins. Watch your own popularity increase as you learn the grace, the swing of dancing! No more wall-flower nights, or days of waiting for the phone to ring! This is your chance to fill your future with Romance.

Make this FREE test!

"Dancing," by Betty Lee, includes everything you need to know about dancing. Instructed by this well-known teacher, you learn the fundamental steps in the right way . . . quickly. But you need not take our word for it! You may return the book in 5 days and get your money back if you are not delighted with results! And remember, we include two books FREE of extra charge . . . "Tip Top Tapping" and "Swing Steps." Let these three books teach you to dance for fun or money—or it costs you nothing!

SEND NO MONEY

When your books arrive, deposit $1.98 plus postage with the postman. Practice these simple dance steps each day and in 5 days if you have not learned to dance, we will refund your money at once. Act now and surprise your friends at the next party!

Pioneer Publications, Inc.,
1790 Broadway, N. Y. C.

PIONEER PUBLICATIONS, INC.
1790 Broadway, Dept. 791-H, New York, N. Y.

Gentlemen: Send me "Dancing" by Betty Lee. I will pay postman $1.98 (plus postage) on arrival. If in 5 days I have failed to learn to dance, I will return the book and you will refund purchase price. Include FREE of extra charge "Swing Steps" and "Tip Top Tapping."

Name .....

Address .....

City ..... State.....

CLASSIFIED ADVERTISING

American Jiu Jitsu

COMMANDO FIGHTING. BOOK No. 1. 36 Knockouts and Death Blows without the use of fists. 52 illustrations 25c.

BOOK No. 2. A series of come-along holds that will enable you to subdue and hold any man with ease. 45 illustrations 50c.

BOOK No. 3. Shaking down the gunman. Shows how to approach, search and disarm armed persons so they can't disarm you. 51 illustrations 50c.

BOOK No. 4. How to be winner in clean or dirty fighting. Fear no man, knife, club or gun. 108 pages, pocket size, 151 illustrations $1.00.

SPECIAL ALL 4 BOOKS copyrighted by the world's most famous instructor $2.00 postpaid. C.O.D. in U.S.A. only $2.00 plus postal charges.

S. J. JORGENSEN, 1305 Maritime Bldg., Seattle, Wash.

Patents Secured

INVENTORS—Protect your idea with a Patent. Secure "Patent Guide"—Free. No charge for preliminary information. Write Clarence A. O'Brien and Harvey Jacobson, Registered Patent Attorneys, 351-B Adams Building, Washington, D. C.

PATENTS—Reasonable terms. Book and advice free. L. F. Randolph, Dept. 513, Washington, D. C.

INVENTORS—PATENT YOUR INVENTION. Secure book, "Protect, Finance and Sell Your Invention." No obligation. McMorrow and Berman, Registered Patent Attorneys, 151-K Albee Building, Washington, D. C.

PATENTS SECURED. Two valuable booklets sent free. Write immediately. Victor J. Evans & Co., 728-A Merlin Building, Washington, D. C.

Photo Finishing—Developing

ROLLS DEVELOPED—25c Coin. Two 5x7 Double Weight Professional Enlargements, 8 Gloss Deckle Edge Prints. Club Photo Service, Dept. 17, LaCrosse, Wisconsin.

Correspondence Courses

CORRESPONDENCE COURSES and self-instruction books, slightly used. Sold. Rented. Exchanged. All subjects. Satisfaction guaranteed. Cash paid for used courses. Complete details and 84-page illustrated bargain catalog Free. Write Nelson Company, 500 Sherman, Dept. B-215, Chicago.

Detectives—Instructions

DETECTIVES EARN BIG MONEY. Work home or travel. DETECTIVE particulars free. Experience unnecessary. Write GEORGE WAGONER, 2640-A Broadway, New York.

Old Gold Wanted

GOLD $35 OUNCE. Mail old gold teeth, diamonds, jewelry, watches—receive cash by return mail. Satisfaction Guaranteed. Free information. Paramount Gold Refining Co., 1500-G Hennepin, Minneapolis, Minn.

Nurses Training School

MAKE UP TO $25-$35 WEEK AS A TRAINED practical nurse! Learn quickly at home. Booklet Free. Chicago School of Nursing, Dept. D-1, Chicago.

Old Money Wanted

WE BUY INDIAN CENTS, Lincoln Cents, and Old Rare Coins. Send 10c today for 1943 Catalogue of prices we pay for all U. S. coins. American Rate Coin Co., Dept. 15, Transportation Bldg., Chicago.

OLD MONEY WANTED. Do you know that Coin Collectors pay up to $100.00 for certain U. S. Cents? And high premiums for all rare coins? I buy all kinds. Send 4c for Large Coin Folder. May mean much profit to you. B. Max Mehl, 440 Mehl Bldg., Fort Worth, Texas.

Baby Chicks

COLONIAL CHICKS. World's largest production means lowest prices. Leading breeds. Catalog Free. Colonial Poultry Farms, Pleasant Hill, Mo.

Miscellaneous

UNBELIEVABLE spare or full time money making opportunities. Home or office. Details free. Lumco, Kimball, Nebraska.

Art Pictures

THRILLING CUBAN—MEXICAN Art Pictures—Books—Miscellaneous. Samples—Lists—50 cents. Jordan, 135-D Brighton, Boston, Mass.

Numerology

LUCKY NUMBERS. Marriage, Vocation $2.00. Send full name, date birth, 3 questions. Helyn Hitchcock, 4625 Old Mill, Ft. Wayne, Indiana.

scope hood, McGee lifted the *Good-by Jane* away from that colossal rusted valve. He set the pilot-robot on a course for Freedonia.

Anders felt deeply relieved, to let that mighty machine drop behind. Perhaps its greatest enigmas were yet unanswered. Now he never hoped to know what those things had been, that once had climbed the winding narrow footways beside those high contraterrene rails. But that was only a futile riddle of the dead past. He was glad to leave it, for the living future dawning.

"Happy, darlin'?" he whispered to Ann O'Banion.

But she seemed tense and apprehensive.

"How could we be happy, Paul?" Her dark eyes were still accusing. "Have you forgotten about the Drakes?" She turned anxiously to little McGee. "Now, Cap'n Rob, since we have the ship, can't we call and warn them that von Falkenberg is coming?"

The little spaceman shook his head.

"The *Challenge* is straight between," he told her. "It has a sensitive receiver, and it's only six hours away. Von Falkenberg would be sure to hear the call, and turn back to finish us."

"Nothing we can do." Anders grinned cheerfully. "And the Drakes can fight their own battles. So smile again, gorgeous."

He touched her brown bare arm, but she moved away.

"Sorry, Paul." Her quiet voice seemed friendly, but her eyes were dark again with blame. "You see I grew up with Rick Drake, and old Jim was a better father than my own. If anything happened to them, I just couldn't stand it."

"'Scuse me, darlin'." He nodded gravely. "I understand."

He knew she couldn't forget his final challenge to von Falkenberg. He was responsible for the danger to Freedonia, and that made a chasm between them, deeper than the gulf of space. The five days of their homeward flight seemed very long to Anders.

The *Challenge* was a little faster than the *Good-by Jane*. McGee estimated that von Falkenberg would reach Freedonia twelve hours ahead of them. As that time approached, on the last day back, they took anxious turns at the tug's single periscope.

Ann had the instrument when it happened.

Freedonia was still several million kilometers ahead, and Anders knew that the airless

atom of dark nickel-iron was not yet visible in the field. But he saw the asterite girl catch her breath. She stared intently for an endless moment, and then turned slowly from the black hood.

"That was it!" Her tired eyes looked at Anders, dilated and tortured and accusing. "A hot blue flash, right where Freedonia must be. It had the color of a seetee explosion. It means von Falkenberg has wrecked the hammer—and likely murdered the Drakes!"

Anders tried to grin, but his lean face turned solemn.

"Please, darlin'," he protested quickly. "Might be you're mistaken. And I can't quite stand that look on your face."

He turned quickly to McGee.

"S'pose you call Freedonia on the photophone, Cap'n Rob? Now we're close enough to run for Obania, if we must. But I don't think von Falkenberg will answer."

With a curious look on his brown seamed face, McGee stepped nimbly to the ship's photophone. His soft calm voice went out on the beam of questing light:

"McGee, calling Freedonia. . . . McGee, calling Freedonia."

Ann stood waiting, pale and silent, with small brown hands knotted into desperate fists. Little McGee appeared deliberate as always. He paused to draw again on his short black pipe.

At such a distance, Anders knew, the thin beams of modulated light should bring a reply in less than a minute. But the receiver merely hissed with the faint dry rustle of stellar interference.

A long minute passed, and then another. Listening to the thin eternal whisper of the starlight, Anders couldn't help expecting it to turn into the hoarse moronic croak of Franz von Falkenberg.

"Hello, Rob!" It wasn't the Martian's rasp, but the deep rusty voice of old Jim Drake. "Mighty glad to hear you. We've been worried—"

Anders felt a choking gladness in his throat. McGee's leathery face didn't change, but the squinted eyes turned bright with tears. Ann made a little gulping sob. She gave the Earthman a dark, startled glance, and snatched the receiver.

"Oh, Seetee—" She swallowed, breathless. "Are you all right? And Rick? You got away from von Falkenberg? You weren't hurt in that explosion?"

But old Jim Drake wouldn't hear her questions, for several seconds yet. They all leaned close to the receiver, listening. The girl was staring at Anders, with dark strange eyes. And the deep rusty voice went on:

"—worried, since you called. Say, Rob, a queer thing just happened. Maybe you can explain it. We saw a seetee flash, out where the mine field is. Can't quite understand it, because the mines are far inside our private swarm of seetee drift—"

The deep voice paused, and changed.

"Ann?" Back across the thread of trembling light, his delayed answer came loud and glad above the whisper of the stars. "Why, of course we're all right, Ann. We haven't seen von Falkenberg. And there was no explosion, except that flash in space."

The girl was staring at Anders, not breathing.

"But what about you, Ann?" came the voice of the old engineer. "We've been uneasy. Tell me, how did you get aboard the *Jane?* What happened to your Interplanet friend, Captain Anders?"

Grinning, the tall Earthman took the receiver from her.

"Anders speaking, Mr. Drake. And don't hang up. 'Cause things are different now. I'm quitting Interplanet. Ann has promised me a job—helping you build the seetee machines, on McGee's bedplate. And I can tell you why you haven't seen von Falkenberg."

Ann listened, wide-eyed, not moving.

"Y'see," Anders said, "that flash was Franz von Falkenberg. He had taken the *Challenge,* with a crew of spies and mutineers. He was carrying about a ton of seetee—one of those bedplates, welded outside his hull for a model. He tried to approach Freedonia, to smash your seetee hammer. But he must have left his safety field on, so it tripped your peegee mines."

In that gray padded room, tiny and crowded with the astragation instruments, Ann moved a little toward the lean black-clad Earthman. Her brown smooth throat pulsed, to a hard gulp. Her gray eyes shone with sudden tears.

"So you planned it that way, Paul?" she whispered huskily. "When Franz von Falkenberg thought he had everything—when he was leaving us marooned in that terrible machine—you sent him back to be wrecked against the mines?"

"Seemed the only thing to do," Anders said.

"But why—" She swallowed hard. "Why didn't you tell me what you meant?"

"Couldn't," Anders said. "I was sure nobody on the *Challenge* knew about the mines. But still it was a pretty desperate gamble, to take with such good friends of yours. Von Falkenberg has said I wasn't very clever. 'Fraid he'd turn out right."

His voice dropped low, and his gray eyes turned dark as hers.

"But it hurt—the way you looked at me, darlin'."

"Oh, Paul, I didn't understand." She gulped again. "I was worried so about the Drakes, and couldn't quite believe that you were really one of us." Her full lips tried to smile. "Besides, I don't think you were very clever, really, not to tell me what you were planning. But, please, can you forgive me?"

She stood tall and near, very lovely in the blue silk that had been his pajamas. Her dark hair had a clean perfume. Her tanned soft face was bright and eager, and her wet eyes were smiling. Her parted lips looked very nice to kiss.

And now the barrier between them was gone.

"Just lemme show you, darlin'."

Little Rob McGee took away the dangling photophone receiver, because he saw they had both completely forgotten it. He told old Jim Drake to expect them in twelve hours, and hung up, and calmly filled his stubby pipe.

They came to Freedonia, twelve hours later. McGee brought the *Good-by Jane* down through the warning beacons and the drift and the field of unseen mines, to a safe landing on that bleak black cube of airless iron.

The Drakes came aboard again. Still they were tired, red-stubbled men, but now they were giants again, mighty with the strength of spatial conquest. Old Jim Drake crushed the Earthman's hand, rumbling softly:

"Glad to take you in the firm, captain."

The bronze-haired younger giant, however, still seemed a little cool. Ann, with her gray eyes shining, took him aside to the end of the narrow wardroom and whispered something. He came back to Anders, grinning and awkward and likable.

"Congratulations, captain," he said. "Sorry if I didn't seem quite friendly. But I thought—" With a flush on his space-burned face, he turned incoherent. "Well, I mean—"

"You thought I wanted Karen?" His face turned redder, and Anders grinned. "And maybe once I did, 'cause your redhead's pretty wonderful, Drake. But Ann's the one for me."

His gray eyes looked at the tall girl in blue.

"Used to think we were opposites." His voice sank low again. "But that was just 'cause we happened to be fighting for opposing sides. Now, since we've settled that, seems we're pretty much alike."

"Then we want you, Anders."

And Rick Drake gave him a bronzed, mighty hand.

Little McGee towed his skittishly elusive peegee disk back into the narrow wardroom, and displayed it floating above the table. The two giants tested its bobbing repulsion, with great eager hands. Tears wet the blue hollow eyes of old Jim Drake.

"Permanent negative paragravity!" His low rusty voice was choked with glad emotion. "That's the solution I've been hunting, for forty years. Now we can build the bedplates, to fill those empty pits. Now we can finish the seetee shop."

His powerful space-burned hands were trembling, testing the magic of the untouchable disk.

"Looks as if the firm of Drake, McGee & Drake is going to prosper, now," Anders said. " 'Cause we've got more to give mankind than Interplanet ever did. Now the spatial engineers can really conquer space."

He grinned at the tanned bright face of the tall lovely girl beside him.

"I'm mighty lucky, to b'long to the firm." The grin faded, and he took her hand, and his low whisper turned very serious. "Darn lucky, darlin'!"

Then he heard a cough, and the loud voice of Rick Drake:

"—just one danger, that I can see. Captain Anders and our mines finished Franz von Falkenberg. But it's possible he had already made a photophone call to Mars, giving the position of the Invaders' power plant."

Rob McGee took the short pipe out of his mouth.

"I took care of that," he told them calmly. "You see, although that machine had been badly neglected for the last hundred thousand years or so they used it, I found the repulsion drive still in working order—"

"Eh!" Anders caught a startled breath, then slowly nodded. "Never thought of that, but s'pose it could be. Frictionless bearings

don't wear out. Seetee fuel doesn't deteriorate. But what did you do?"

McGee drew deliberately on his pipe.

"The last three days we were there," he said, "I had the drive field on, to push the machine into a different orbit. Now it won't come back to the meteor belt. No danger the Martians will find it, even if they look. The men of our generation won't see it again."

His mild squinted eyes looked gravely at the tall straight Earthman, and the breathless girl, and the two gaunt red-stubbled giants still bent in fascination over the untouchable disk.

"Not unless I tell them where to look," McGee added gently. "And I don't think I will."

Anders stared at the stubby little spaceman, in the ill-fitting green space coat. McGee looked shabby and ugly and utterly insignificant. For a moment it seemed utterly impossible that he should be the sole trustee of that lost planet's unguessed legacy.

But he had been the finder of it, Anders remembered. His singular gift had vanquished the haunting death that made it a trap for men, and conquered its untold secrets. Now, seeing the calm on his space-beaten face, serene as his native stars, Anders felt that he was worthy of that tremendous trust.

"B'lieve you're right, Cap'n McGee," the Earthman said soberly. "That bedplate, and the seetee machines we can build on it, ought to be enough for our generation. 'Cause I don't think we need too much, that b'longed to the Invaders. Unlike things react. Dunno what their culture would do to ours."

Ann held his hand, her brown fingers tense.

"I'm awfully glad, Cap'n Rob," she whispered to McGee. "Glad that machine is gone. Maybe you understand it, but nobody else ever can." Her golden-tanned shoulder shivered, under the blue silk. "Maybe you think I'm silly, but I always felt the thing was haunted, with the ghosts of the Invaders. I'm glad to know they're gone."

McGee turned calmly away, filling his pipe again. He joined the two gaunt red-bearded spatial engineers, still absorbed in the miracle of the untouchable disk, that would support the contraterrene machines of tomorrow.

For Paul Anders and Ann O'Banion had forgotten him. They had even forgotten the thin tall ghosts, that they had both imagined on those narrow winding contraterrene footways, where men could never tread.

THE END.

With the United States at

WAR

WHAT ARE YOU GOING TO DO TO HELP?

You're a good loyal American; you want to do your part. All of us can't be soldiers, or sailors, or air pilots, but we can serve. One way to do it is to master a trade or vocation which will help win the war and at the same time prepare you for a good position after the war is over.

I am Ready to Help You HELP WIN THE WAR

CRIME IS AN ENEMY

Training which enables you to thwart crime within our own borders will help to win the war with the Japs and other foreign foes. You'll get such training through the I.A.S. Course in Finger Printing and other Crime Detection Methods, and you can *learn right at home*, in spare time, at small cost.

For 26 years the I.A.S. has been preparing ambitious men to fill responsible positions in Identification Bureaus throughout America. Today over 43 per cent of all the Nation's Identification Bureaus are run by our graduates.

Fascinating—Thrilling Profitable

Scientific crime detection offers excellent opportunities *now* . . . and the future promises even greater possibilities. A recent Gallup poll shows that 69% of America's population wants every one in the U.S. to be finger printed right *now*. Hundreds of Defense Plants are now finger printing employees. The potential value of finger print training grows day by day.

NOW'S THE TIME TO START

Now . . . when the demand for our graduates is greater than ever before . . . when new Bureaus and National Defense are finding need of more and more trained finger print experts . . . makes the present time the ideal time to get into this pleasant, profitable, thrilling work.

FREE "BLUE BOOK OF CRIME"

Gives the case histories of famous crimes and how they were solved by experts. This book has been an "eye-opener" to thousands. It told them how they could prepare themselves at small cost and in short time to fill good-pay, responsible positions in Identification Work. Send for it FREE today stating age.

INSTITUTE OF APPLIED SCIENCE
1920 Sunnyside Ave., Dept. C-277, Chicago, Ill.

Use This VICTORY Coupon!

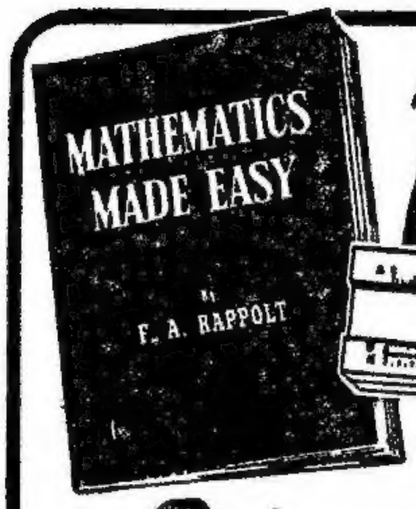
INSTITUTE OF APPLIED SCIENCE
1920 Sunnyside Ave., Dept. C-277, Chicago, Ill.

Gentlemen: Without obligation, send me the "Blue Book of Crime" and complete list of over 840 bureaus employing I.A.S. graduates. Also give me information regarding cost and terms.
(Literature sent *only* to persons stating age.)

Name..... Age.....

Address .....

City..... State.....



FREE!

THIS VALUABLE NEW BOOK "Mathematics Made Easy"—gives you simplified instruction in every phase of figuring ALL types of work, PLUS a FREE Deluxe Professional 10 inch SLIDE RULE. Saves time, simplifies all calculating, fractions, estimating, percentage, decimals, costs, ratios, etc. Complete instructions for using a Slide Rule. BOTH FREE—with this offer.

if you want

A BETTER JOB and BIGGER PAY

Learn

Thru New SHADOWGRAPH Method —You Read Blueprints the First Day

BLUEPRINT READING

AMAZING NEW INVENTION

Makes Blueprint Reading Easy as Seeing a Movie
Learn at Home—Easily, Quickly—In Spare Time

MEN of ALL AGES and ALL TRADES
if you are a
Mechanic, Student, Welder, Carpenter, Plumber, Shipbuilder, Machinist, Sheet Metal Worker, Tool Maker, Electrician, Steel Worker, Aviation Mechanic, etc.,
you must know
BLUEPRINT READING
to win promotion and bigger pay

THOUSANDS OF MEN WANTED AT ONCE!

Better Jobs—Bigger Pay are waiting for men who can READ BLUEPRINTS. Here, at last, is a new, quick and easy shortcut way to learn Blueprint Reading at Home in an amazingly short time—at an unbelievably low cost. This sensational "Shadowgraph" Method of Blueprint Reading was created by Nationally Famous Experts—skilled in teaching technical subjects to men without previous technical education. They have eliminated all complicated details, they explain all technical words in simple language. Contains everything you need to know about Reading Blueprints—no matter what kind of work you do.

NOW ANYONE CAN READ BLUEPRINTS

Everything about Blueprint Reading is put right at your finger-tips! Simple as A, B, C. No need to attend an expensive trade or technical school. No previous technical or special education is needed. Here's a speedy Blueprint Reading Course for all trades that is ABSOLUTELY different. No dry textbooks—you learn by seeing and doing—and you READ BLUEPRINTS from the very FIRST DAY. With this amazing new method—a few minutes a day is all you need to read Blueprints on sight. This simplified, spare-time, Home Study Course meets all Blueprint Requirements for Civil Service and National Defense Jobs.

CREATED BY NOTED EXPERTS:
H. V. WALSH, B.A., Professor, Columbia U., 1919-1935; F. A. RAPPOLT, B.S., C.E., Prof., School of Tech., City College, N. Y.; F. E. BURNS, B.S., M.E., Prof., Newark Col. of Engineering.

QUALIFY QUICKLY FOR A BIG PAY JOB

Here is really big news for you—if you have a job, or if you want a job in any branch of aviation, shipbuilding, sheet metal work, welding, electricity, machine tooling, plumbing, carpentry, radio building, automotive and Diesel Engineering, or any other of the mechanical, construction or DEFENSE INDUSTRIES—the AUSTIN TECH. "Shadowgraph" Method CAN HELP YOU QUALIFY for a BETTER JOB AND BIGGER PAY in an amazingly short time. This marvelous home-study method is so easy—it enables even a school boy to learn Blueprint Reading from the first day!

This 24-Volume Blueprint Reading Course is packed in a specially constructed bookcase, which in itself is a unique "Working Model" designed to enable you to read Blueprints from the first day. The Course contains over 600 Actual Blueprints—Charts—Tables—Diagrams—Signs—Symbols and other Instructive Pictures that help you to read Blueprints practically on sight.

EVERYTHING IS SENT TO YOU AT ONCE!

The complete 24-Volume Blueprint Reading Course is sent to you together with the specially constructed "Working Model" Bookcase. You also get FREE—"Mathematics Made Easy" and Professional Slide Rule. Everything is sent in one shipment. ACT TODAY—DUE TO RISING PRICES FREE GIFT OFFER IS LIMITED.

AUSTIN TECHNICAL INSTITUTE
899 Broad Street, Div. SS-1, Newark, N. J.

SEND NO MONEY

FREE EXAMINATION

AUSTIN TECHNICAL INSTITUTE,
899 Broad St., Div. SS-1, Newark, New Jersey

Send me on FREE APPROVAL your complete 24-Volume Blueprint Reading Course with special "Working Model" Bookcase. I am to get FREE "Mathematics Made Easy" and Professional Slide Rule. I will pay postman $1.95, plus postage and C. O. D. charges on arrival. If I return everything within 5 days you are to refund my money in full. Otherwise I will remit $2 monthly for 3 months and a final payment of $1 for the 4th month until the total price of $8.95 is paid. (10% discount if full payment accompanies order—same refund guarantee.)

Name .....

Address .....

City .....State .....

References .....

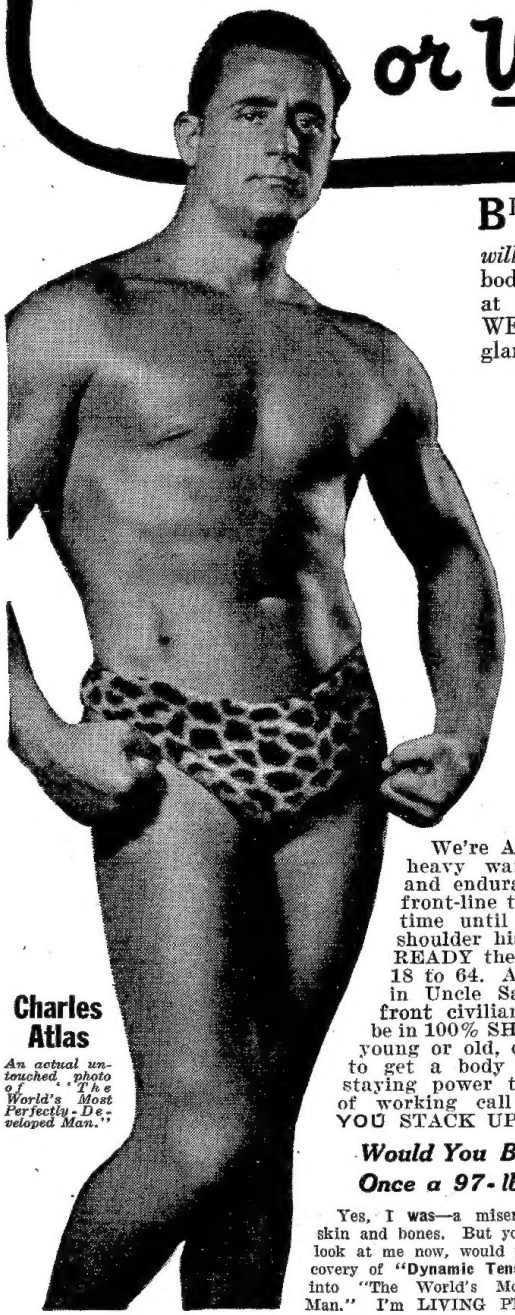
Address .....

NOTE: If you enclose $1.95 with coupon—we will pay all postage charges. Every cent refunded if not satisfied.

Behind Your Back--

WHAT IS SHE CALLING YOU—

HE-MAN or Weakling?



Charles Atlas

An actual untouched photo of "The World's Most Perfectly-Developed Man."

BELIEVE it or not—the girls are sizing you up *all day long!* Whether they look at you TWICE is up to YOU! They *will* if you have a rugged, healthy, big-muscled HE-MAN body, glowing with strength and vigor, but they'll just snicker at you behind your back if you're a skinny, no-muscle WEAKLING! If YOU, too, want to feel those admiring glances right through your back then listen to this:

Let Me Prove I Can Make YOU a NEW MAN—Charles Atlas

Will you give me just 15 minutes a day of your spare time? That's all I need to PROVE—regardless of how old or young you are, or how ashamed you may be of your present physique—that I can give you a body men envy and women admire. Biceps that can dish it out, and a muscle-ridged stomach that can take it. A full, deep barrel-chest. Legs that never tire. A tough, sinewy back. An all-around physique that can laugh at ANY kind of rough going.

We're ALL in the Army today! The heavy war-time demands on strength and endurance are no longer limited to front-line trenches. It's only a matter of time until EVERY citizen is called to shoulder his full share of the load. ALREADY the Army has enrolled men from 18 to 64. And whether you do your part in Uncle Sam's Services or as a home-front civilian, you've GOT to be in 100% SHAPE. Every man, young or old, owes it to himself to get a body with the bulldog staying power that double shifts of working call for. HOW DO YOU STACK UP?

Would You Believe I Was Once a 97-lb. Weakling?

Yes, I **was**—a miserable 97-pound bag of skin and bones. But you'd never believe it to look at me now, would you? Through my discovery of **"Dynamic Tension"** I changed myself into "The World's Most Perfectly-Developed Man." I'm LIVING PROOF of the miracles **"Dynamic Tension"** can perform—right in the privacy of your own home! NOW—will you give my method 15 minutes a day to get the kind of HE-MAN build you have always longed to have?

FREE BOOK

"Everlasting Health and Strength"

Just a postage stamp will bring you your copy of my famous book, "Everlasting Health and Strength," absolutely free. No wonder nearly 2,000,000 men have sent for this big 48-page story of **"Dynamic Tension"**—illustrated with action photos of myself and some of my pupils. You'll not only read about my secret of **"Dynamic Tension"**—but you SEE PROOF of it! **CHARLES ATLAS, Dept. 62I, 115 East 23rd Street, New York, N. Y.**

CHARLES ATLAS, Dept. 62I,
115 East 23rd Street, New York, N. Y.

I want the proof that your system of "Dynamic Tension" will help make a New Man of me—give me a healthy, husky body and big muscular development. Send me your free book, **"Everlasting Health and Strength."**

Name .....
(Please print or write plainly)

Address .....

City..... State.....

This year
BE WISE!
Clear Heads Choose
Calvert
The whiskey with the
"Happy Blending"
Calvert
Clear Heads Choose Calvert
Calvert
SPECIAL
Blended Whiskey
The whiskey of good taste
BLENDED & BOTTLED BY
THE CALVERT DISTILLING CO.
Clear Heads Choose Calvert
Calvert
RESERVE
Blended Whiskey
Calvert embodies that unusual smoothness and gratifying bouquet so pleasing to the connoisseur
BLENDED & BOTTLED BY
THE CALVERT DISTILLING CO.
Calvert Distillers Corp., N. Y. C. BLENDED WHISKEY Calvert "Reserve": 86.8 Proof—65% Grain Neutral Spirits . . . Calvert "Special": 86.8 Proof—72½% Grain Neutral Spirits.